ISSUE 202 DEC/JAN 2010/2011

Better Homes and Gardens®

# WOOD®

Buy Good Plywood: We Crack the Grading Code! p.28

## Top Tool Innovations for 2011

*Like this game-changing saw!* p.72

## Plus Great Gift Projects!


Glass-top Display Table p.40

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Gumball Machine p.52


**37 Shop Tips Inside!**

**SPECIAL MITERSAW ISSUE!**

Cut Airtight Joints p.20

Get Perfect Crosscuts p.49

10" Sliders Shop-Tested p.56


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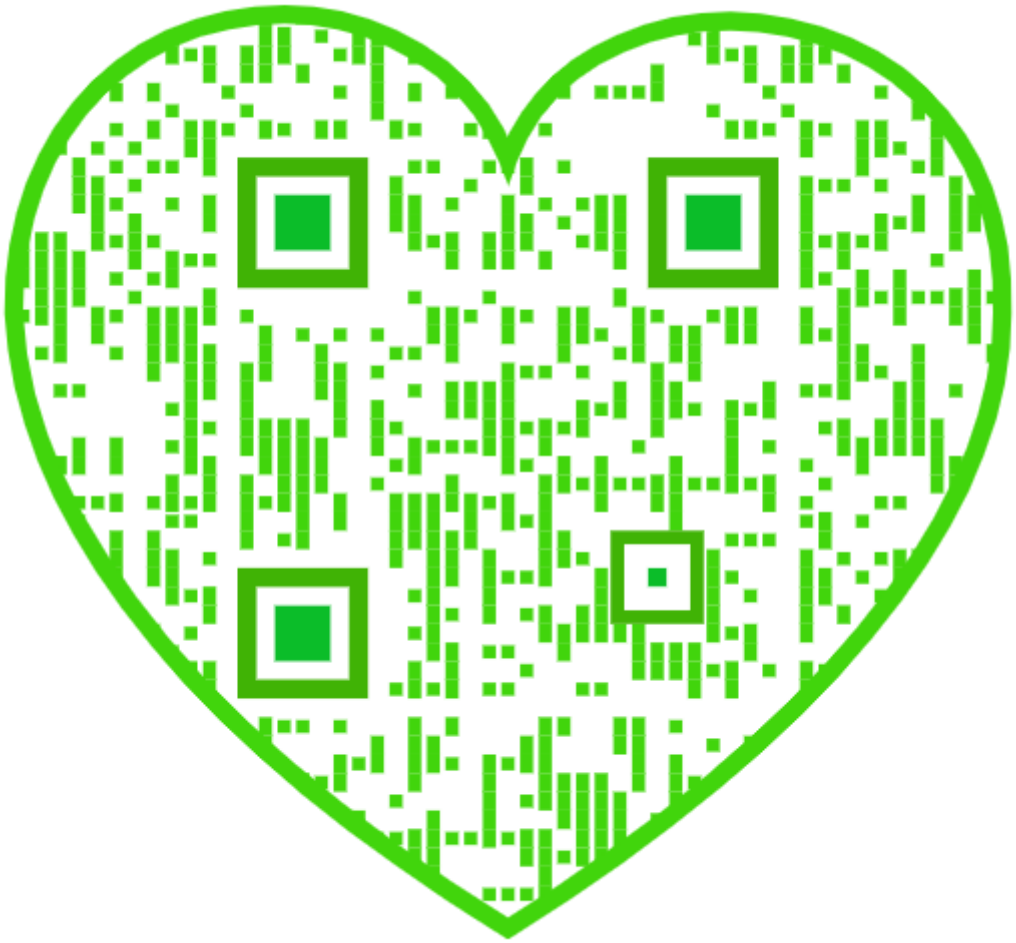

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- Motor: 5 HP, 220V, single-phase
- Table size with extension: 30 3/4" x 48 3/8"
- Arbor speed: 3600 RPM
- Arbor: 5/8" & 1"
- Max. dado width: 3/4"
- Max. rip capacity: 36"
- Max. depth of cut: 4" @ 90°, 2 3/4" @ 45°
- Approx. shipping weight: 756 lbs.

FEATURES DIGITAL BEVEL ANGLE READOUT

INCLUDES 12" BLADE

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- Motor: 5 HP, 220V, single-phase
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- Min. stock length: 7 1/2"
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- Motor: 1 HP, 110V or 1 1/2 HP, 110V/220V, single-phase
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- Rabbeting capacity: 1/2"
- Cutterhead diameter: 2 1/2"
- Cutterhead speed: 4800 RPM
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## 8" x 76" Parallelogram Jointers

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- Precision ground cast iron table size: 8" x 76 3/8"
- Cutterhead speed: 5350 RPM • Cutterhead dia.: 3 3/16"
- Deluxe cast iron fence: 36"L x 1 1/4"W x 5"H
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- Approx. shipping weight: 597 lbs.

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BUILT IN MOBILE BASE

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## 12" x 83 1/2" Parallelogram Jointers

- Motor: 3 HP, 220V, single-phase
- Precision ground cast iron table size: 12 3/4" x 83 1/2"
- Cutterhead speed: 4950 RPM
- Max.depth of cut: 1/8"
- Max. rabbeting capacity: 3/4"
- Approx. shipping weight: 1059 lbs.

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- Sanding motor: 1 1/2 HP, 110V, single-phase
- Conveyor motor: 1/8 HP, 110V, single-phase, variable speed 5-35 FPM
- Drum surface speed: 2127 FPM
- Max. stock dimensions: 12" wide x 3 1/2" thick
- Min. stock length: 8"
- Sanding drum: 4"
- Sanding belt: 3" hook & loop
- Dust collection port: 2 1/2"
- Approx. shipping weight: 160 lbs.

**G0459** ~~$695.00~~
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MADE IN ISO 9001 FACTORY!

- Motor: 2 HP, 110V/220V, single-phase, TEFC
- Precision ground cast iron table size: 23 5/8" x 17 1/4"
- Table tilt: 5° left, 45° right
- Max. cutting height: 12"
- Blade size: 131 1/2"L (1/8" - 1"W)
- 2 blade speeds: 1700 & 3500 FPM
- Approx. shipping weight: 418 lbs.

Product Reviews & Awards ONLINE grizzly.com

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- Motor: 3 HP, 220V, single-phase, TEFC, 1725 RPM
- Precision ground cast iron table size: 26 3/4" x 19"
- Table tilt: 5° L, 45° R
- Max. cutting height: 12"
- Cutting capacity/throat: 18 1/4"
- Blade size: 143" L(1/8" - 1 1/4" W)
- Blade speeds: 1700 & 3500 FPM
- Approx. shipping weight: 480 lbs.

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HEAVY-DUTY CAST IRON FENCE & CAST IRON TABLE TRUNNIONS!

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  G0691 - 27" x 74¾"
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- Arbor: ⅝"
- Arbor speed: 4300 RPM
- Max. dado width: 13/16"
- Max. rip capacity:
  G0690 - 29½", G0691 - 50"
- Max. depth of cut:
  3⅛" @ 90°, 2 3/16" @ 45°
- Approx. shipping weight:
  G0690-542 lbs. G0691-572 lbs.

3 HP LEESON® MOTOR!

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- Air suction capacity: 775 CFM
- Static pressure at rated CFM: 1.08"
- Intake port: 6" with included 5" optional port
- Impeller: 13½"
- Cartridge filter surface area: 6975 sq. in.
- Overall dimensions:
  38¼" W x 23¼" D x 68½" H
- Approx. shipping weight: 210 lbs.

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COLLECTION DRUM IS MOUNTED ON CASTERS FOR EASY DUST REMOVAL

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BOTH MODELS HAVE BUILT-IN MOBILE BASE

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G1035P
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(SHOWN WITH OPTIONAL WING)

New!

G0513P
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New!

G0656P
8" JOINTER
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**$728.00** $139 shipping

G0656PX
8" JOINTER WITH
SPIRAL CUTTERHEAD
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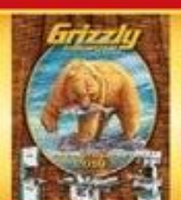
BOTH MODELS HAVE BUILT-IN MOBILE BASE

MORE DETAILS ON THESE EXCITING NEW POLAR BEAR SERIES™ MACHINES AT GRIZZLY.COM®



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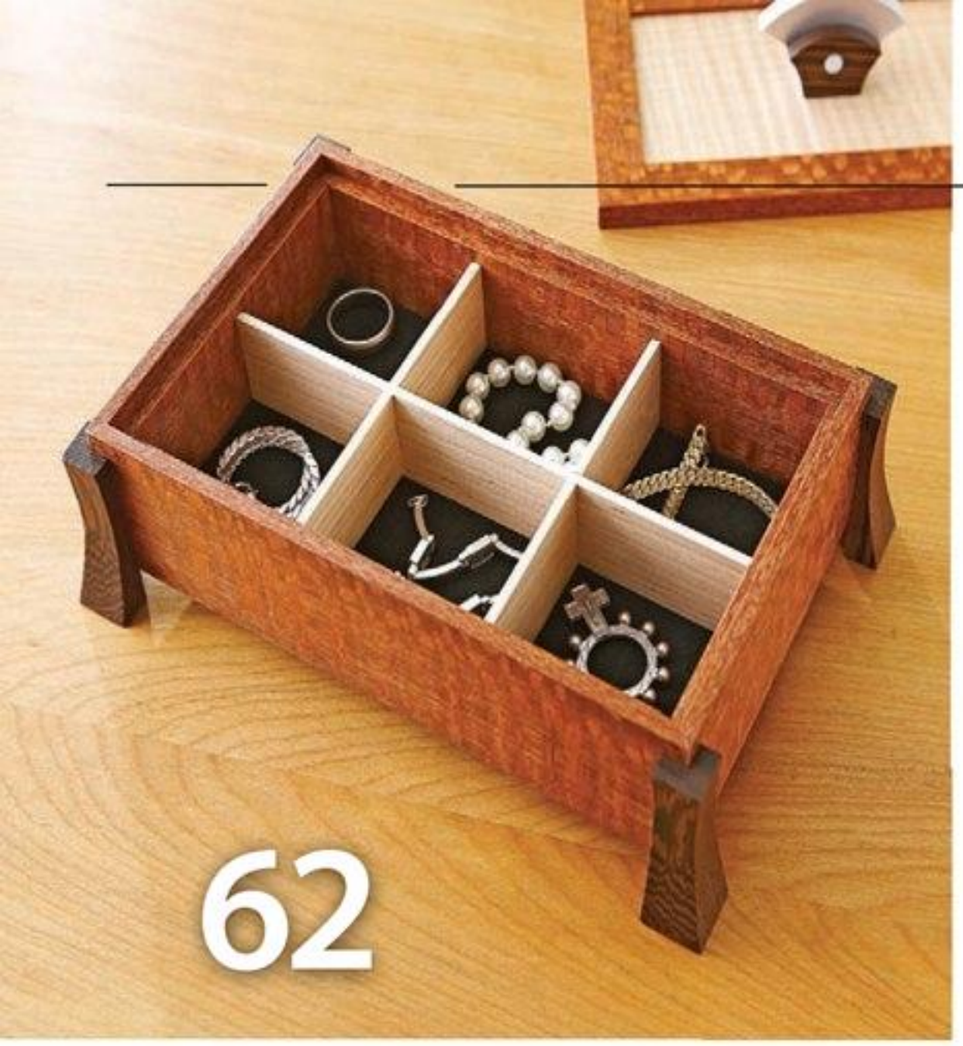


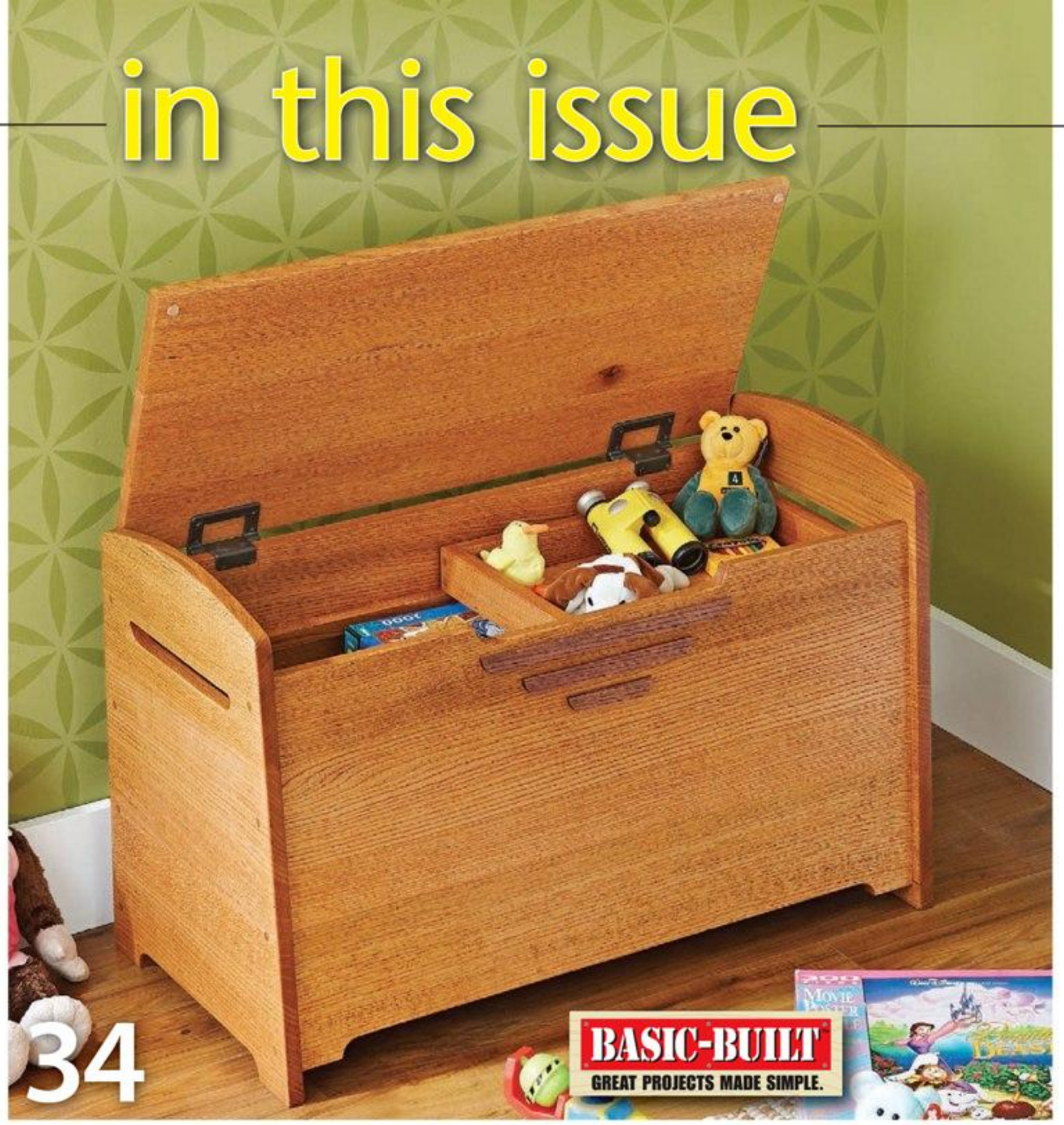


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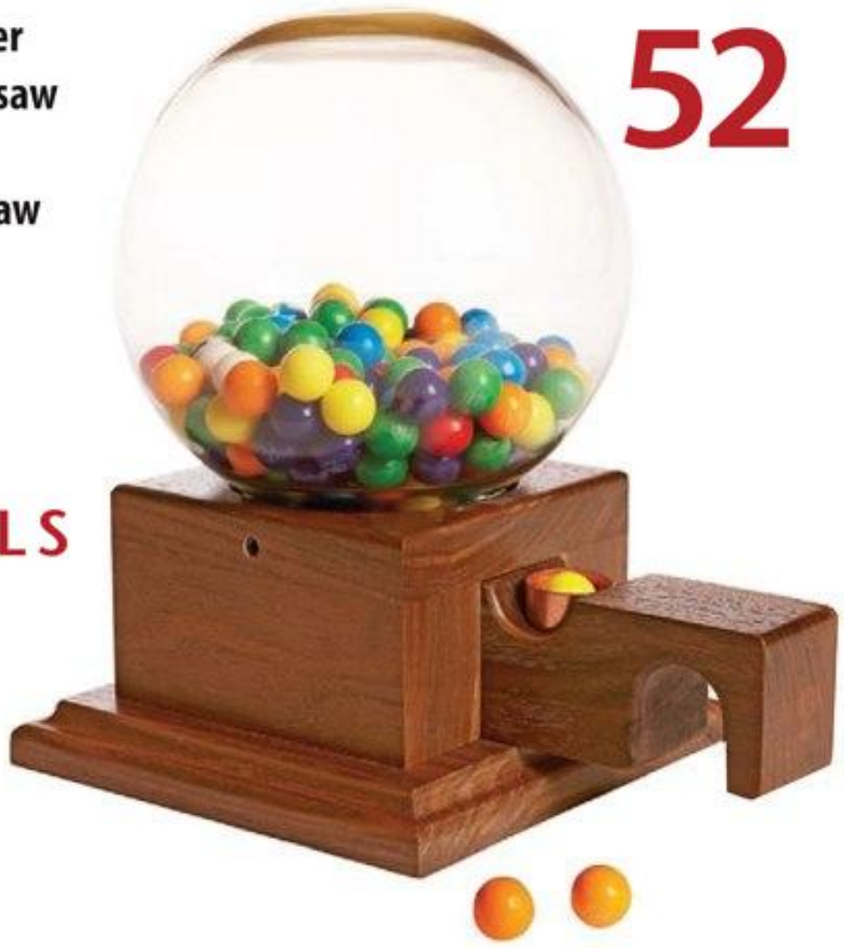
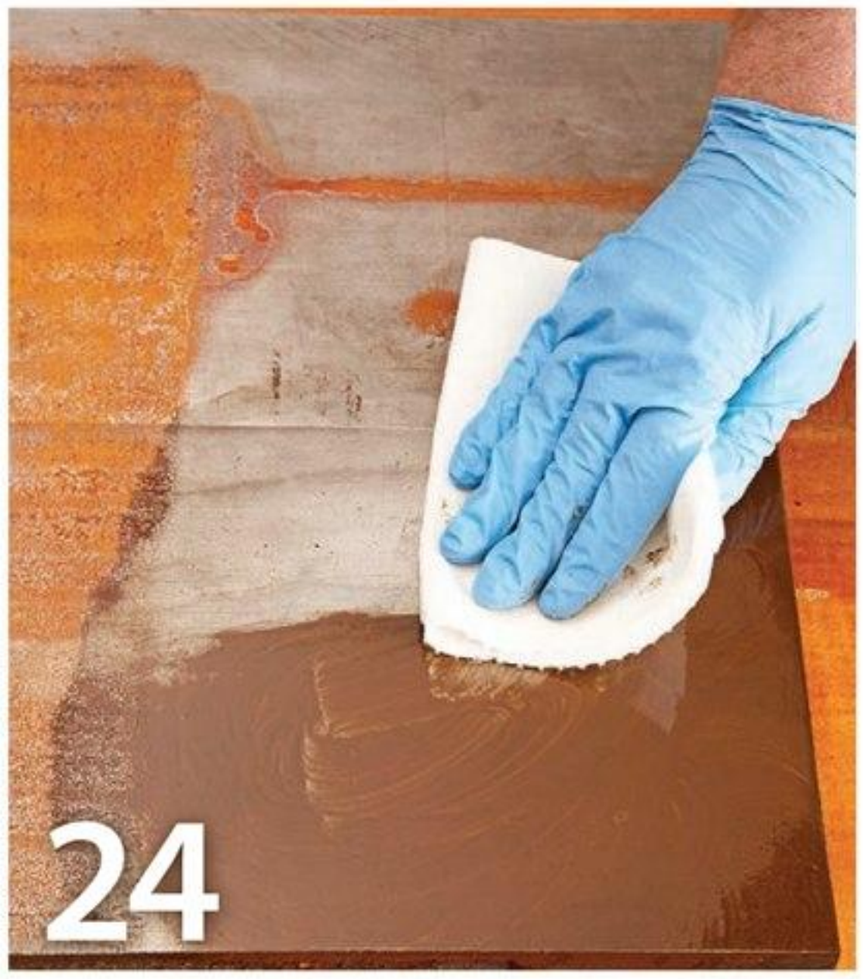
Learn dozens of ways to take a basic wooden box from bland to beautiful.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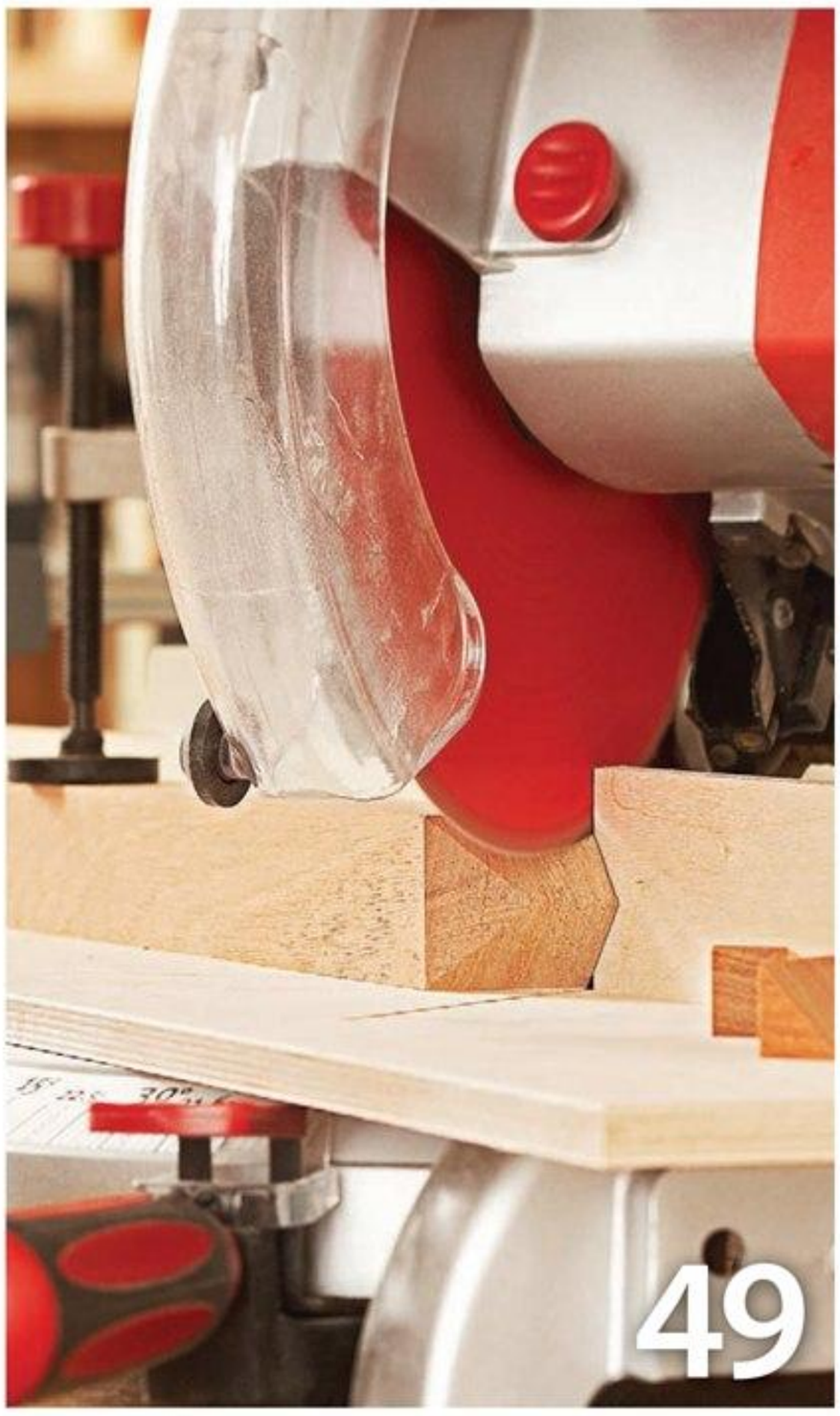
December/January 2010/2011 Issue 202



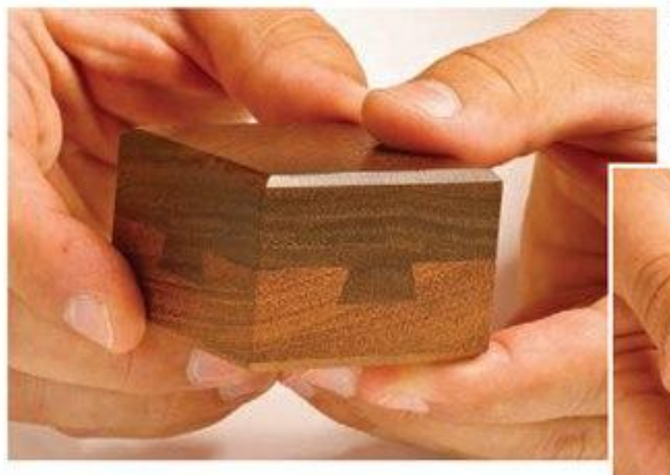

This seal is your assurance that we build every project, verify every fact, and test every reviewed tool in our workshop to guarantee your success and complete satisfaction.

# on our website

## woodmagazine.com

## 12 LAST-MINUTE GIFTS YOU CAN BUILD

- **Quick & Easy Rocking Horse:** woodmagazine.com/easyrockinghorse
- **Tone-of-Fun Tongue Drum:** woodmagazine.com/tonguedrum
- **End-Grain Cutting Board:** woodmagazine.com/cuttingboard
- **Splined Ornamental Box:** woodmagazine.com/splinedbox
- **Contractor-Grade Crane Toy:** woodmagazine.com/cgcrane
- **Child's Dancing Clock:** woodmagazine.com/dancingclock
- **Wristwatch Wall Clock:** woodmagazine.com/watchclock
- **Countertop Wine Rack:** woodmagazine.com/winerack
- **Quilt Ladder:** woodmagazine.com/quiltladder
- **Bread Knife:** woodmagazine.com/breadknife
- **Two Wooden Puzzles** (*right* and *below*)
- **Flag Case:** woodmagazine.com/flagcase



The dovetailed box at *left* looks impossible to open, yet it's deceptively easy to build. Get plans for this and the magnetic-latching puzzle box, *above*, at woodmagazine.com/puzzlepin

## READER VIDEOS INFORM AND ENTERTAIN

Check out videos made by fellow woodworkers, or upload your own. Featured this month at woodmagazine.com/woodtube:

- **Installing Drawer Slides** by James Wheeldon
- **Setting Up a Mortiser** by Charles Neil
- **Episode 77: Jointer Basics** by Kosta
- **From Firewood to Bowl** (*left*) by RonnyV
- **Man vs. Wood** (parody of *Man vs. Wild* cable TV show) by Steve in Marin
- plus hundreds more!

## RESEARCH TOOLS BEFORE YOU BUY

Open the Web browser before the wallet to ensure you get the most bang (and buzz, whir, and whine) for your tool-buying bucks:

- ***WOOD* Shop-Tested Tool Reviews:** woodmagazine.com/reviews
- **Tools and Tool-Buying Forum:** woodmagazine.com/toolforum
- **Tool Guru Scott Spencer's blog:** woodmagazine.com/expertblogs
- **"Intro to Woodworking Machines" video:** youtube.com/wood

freud®

# Freud Creates a New "Rout" To Italy

WOOD® MAGAZINE

## WOOD Magazine Contest

## Build any Creative Project with Extended Tenons & Raised or Flat Panels to Enter to Win!

Grand Prize Value: $10,500

### Prizes to Win:

**Grand Prize:** 4 day/3 night Trip for 2 to Italy and $1,000 of Freud Products

**Second Prize:** $1,000 of Freud Innovative Products

**Third Prize:** $200 of Freud Innovative Products

## Contest Runs: Aug 1, 2010 - Dec 31, 2010

### For More Details Go To:

**www.WOODMagazine.com/FreudContest**

Subject to Official rules at www.woodmagazine.com/freudcontest. No purchase necessary to enter or win. To enter, visit www.woodmagazine.com/freudcontest and click the button to enter. Then complete the registration and follow the instructions to upload one (1) album of photos (up to six (6) photos) of a project utilizing flat or raised panels and extended tenons. One album is one entry. One entry per person. Open to legal residents of the 50 United States, and the District of Columbia, 21 years or older. The Ultimate Rail & Stile Photo Contest entry period begins on August 1, 2010, and ends on December 31, 2010. Entries must be received by 11:59 p.m. C.T., on December 31, 2010. Void where prohibited. Sponsor: Meredith

Better Homes and Gardens®

# WOOD®

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**December/January 2010/2011** **Vol. 27, No. 7** **Issue No. 202**

*As a graduation gift to a niece, Bob built this vanity table, using only a photo for his plans.*

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*Craig designed and built this red-oak cabinet with maple drawer sides.*

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*Mark and his daughter, Carly, made this walnut dresser (issue 160) and bookcase (issue 154).*

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**In Memoriam — E.T. Meredith III (1933–2003)**

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# How Do You Create Endless Cabinet Door Making Possibilities?

**WIN A FREE Trip For Two To Italy!**
Contest Runs Aug. 1 to Dec. 31
www.woodmagazine.com/freudcontest for more details

Profile Shown:
**Round Over**
(#99-760)

Patented design allows for multiple rail & stile project combinations

## With Freud's New Premier Adjustable Rail & Stile System

Now with Freud's new, patented Premier Adjustable Rail and Stile router bit system, you are able to build any style of cabinet door in a wide range of door thicknesses and sizes! This extremely easy-to-use solution gives you unlimited creative freedom, and solves the long-standing limitations of existing frame and panel door construction.

This one of a kind solution allows you to create extended tenons for extra door joint strength, adjust groove width for different panel thicknesses and choose from a variety of material thicknesses for your stiles and rails (5/8" to 1-1/4"). Optional add-on cutters increase your bits' capabilities even more, allowing you to create glass panel and double sided profile doors.

Four profiles are available; **Round Over** (#99-760), **Ogee** (#99-761), **Round Over Bead** (#99-763), and **Bevel** (#99-764).

Standard stub tenons in regular 3/4" stock

Extended tenons for strong joints in larger doors

Glass & screen panel capability

Double Sided Profiles in thick stock

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# Sounding Board

Our bulletin board for letters, comments, and timely updates

## Dazzling jewelry box grabs *WOOD*® magazine honors at show

Tom Thornton of Oceanside, Calif., won the *WOOD* magazine *Excellence in Workmanship* award for his jewelry box, shown *right*, at the 29th Design in Wood Exhibition at the San Diego County Fair. Tom made his 7×10¾×14" solid-wood box from African mahogany, maple, maple burl, and wenge. As with all of Tom's boxes, the front inset drawer opens via a button release.

Over 300 woodworkers entered projects in 22 classes, with $20,000 in prize money awarded. The San Diego Fine Woodworkers Association annually hosts the Design in Wood competition. To see more winning projects from the exhibition, visit woodmagazine.com/designinwood.

WOOD MAGAZINE

## We're looking for a talented craftsman

*WOOD* magazine has a full-time opening for the position of Design Editor at its shop and offices in Des Moines, Iowa. This individual will design and build projects for each issue of the magazine in a fast-paced and creative environment. The ideal candidate will be an enthusiastic self-starter with experience designing and building all types of woodworking projects, knowledge of computer design software, good communication skills, and the ability to demonstrate techniques for videos.

For more details on this opportunity, and to apply, go to www.meredith.com, click on Careers, and search for WOOD.

## Article updates

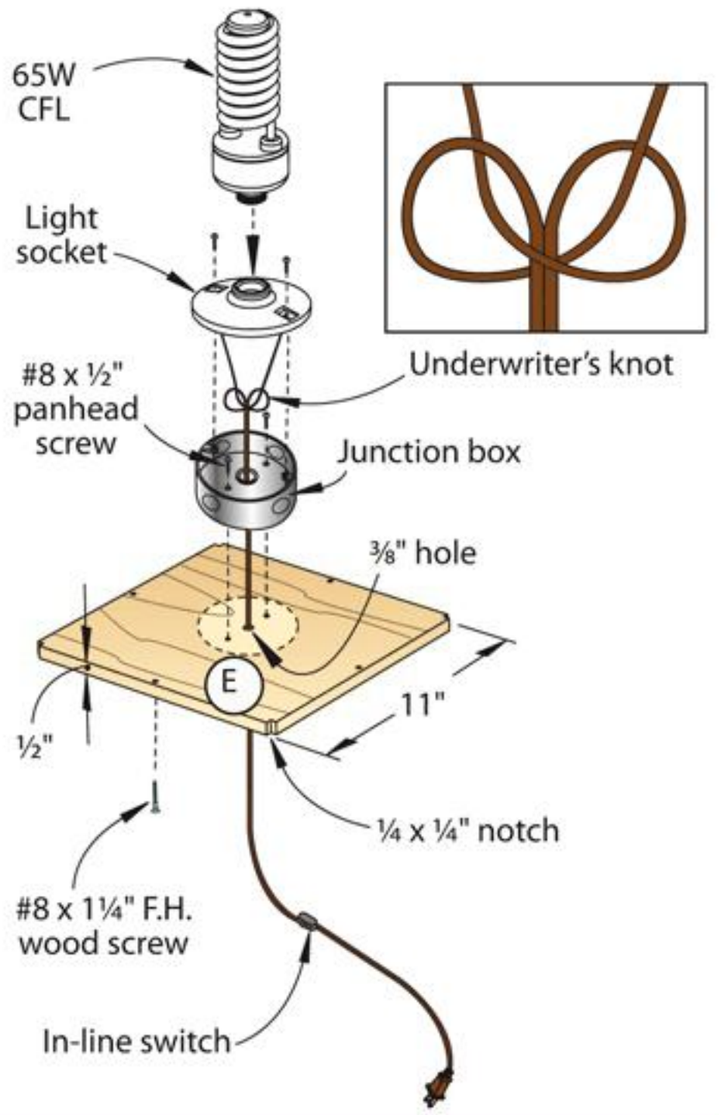
### Issue 200 (October 2010)

If you're building the Luminous Display Pedestal on p. 62, mount the light socket to a junction box secured to the bottom, as shown at *right*, and tie the wires in an underwriter's knot inside the box *(inset)*. This prevents accidentally pulling the bare wire tips from the light socket screws. When securing the wires to the socket screws, be sure to connect the polarized wire—it will have ridges or stripes on the insulation—to the silver-colored screw. Check your local electrical codes before completing this project.

The garage shown in the drawing on page 43 is actually 14'x24'.

### Issue 201 (November 2010)

If you're interested in buying Colt drill bits, found on page 78, go to the company's Web site (colt-tools.com) to find a full list of retailers under the "distribution" link.

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# Shop Tips

Helping you work faster, smarter, and safer

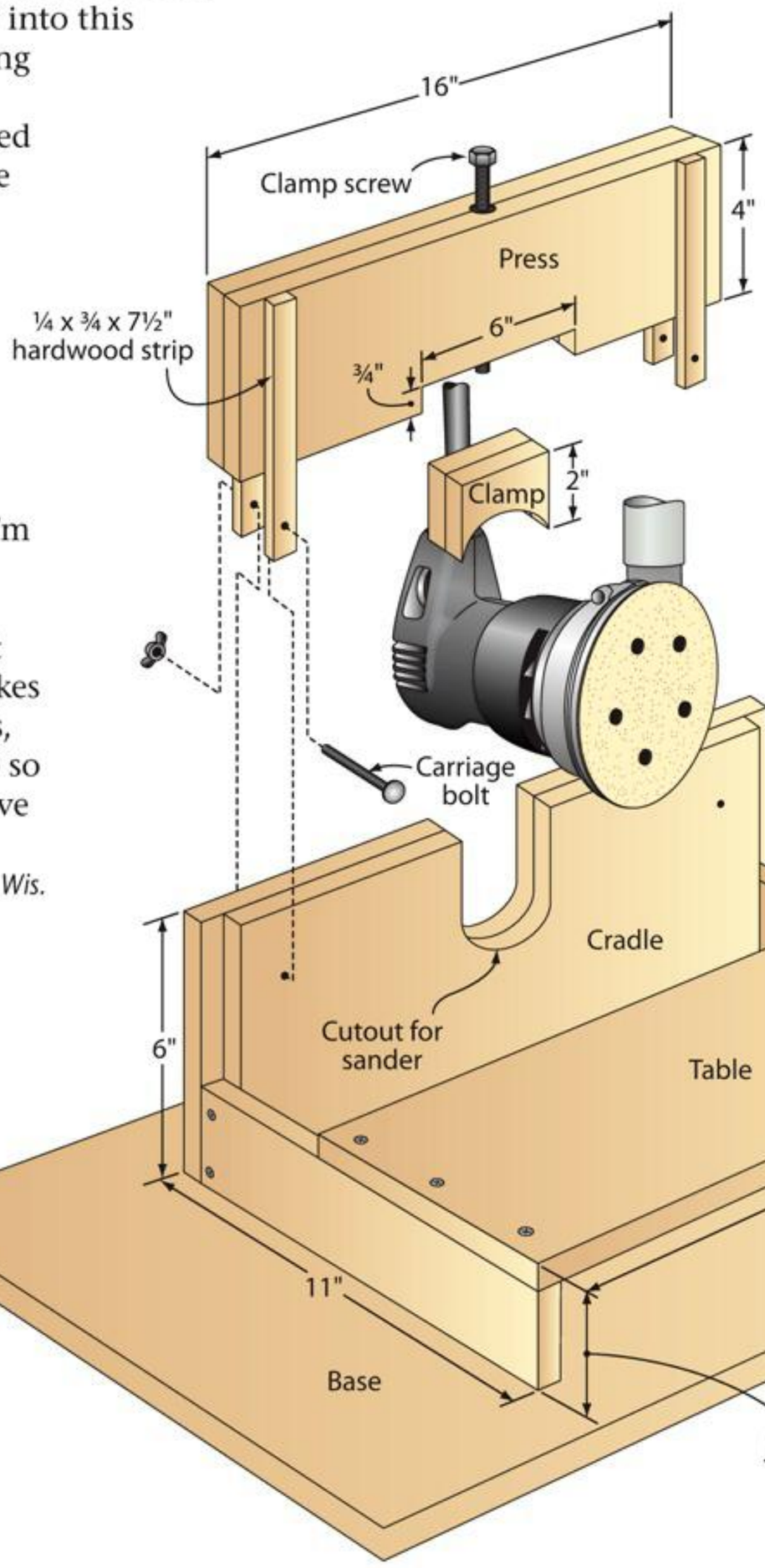
## Convert your R.O. sander to an edge sander

**Top Shop Tip**

My woodworking hobby steered me into refurbishing old furniture years ago. For such delicate work, I needed a small-parts edge sander. So I converted my random-orbit sander into this tabletop edge sander using some scraps of MDF as shown. Once I customized the cutout to support the sander, the rest went together quickly. The sander drops into the cradle, the clamp rests on top, and the press bolts over that. A turn of the clamp screw secures the sander and I'm ready to sand.

Converting back and forth from random-orbit sander to edge sander takes only a couple of minutes, but I've found this setup so useful that I rarely remove it from the holder.

*—Al Wait, Menomonie, Wis.*



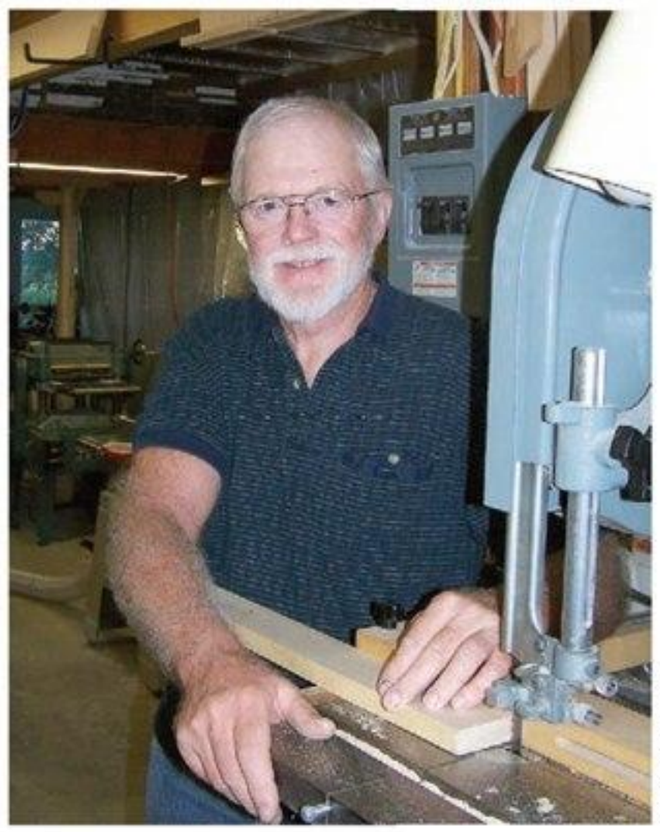



Photo: Mary Wait

**Al's furniture refurbs will go even smoother with Apollo's 7500C Atomizer HVLP spray gun. Congrats, Al!**

*continued on page 10*

## Your tips earn cash, tools!

Tell us how you've solved a workshop stumper. If we print it, you'll get $100 and a copy of *450+ Best-Ever Shop Tips* (woodmagazine.com/450tips). And, if your idea garners Top Shop Tip honors, we'll also reward you with a tool prize worth at least $300.

Send your best ideas, along with photos or drawings and your daytime phone number, to **Shop Tips, WOOD Magazine, 1716 Locust St., LS-221, Des Moines, IA 50309-3023**. Or, by e-mail: shoptips@woodmagazine.com. Include your contact info in the e-mail.

Because we try to publish original tips, please send your tips only to *WOOD*® magazine. Sorry, submitted materials can't be returned.

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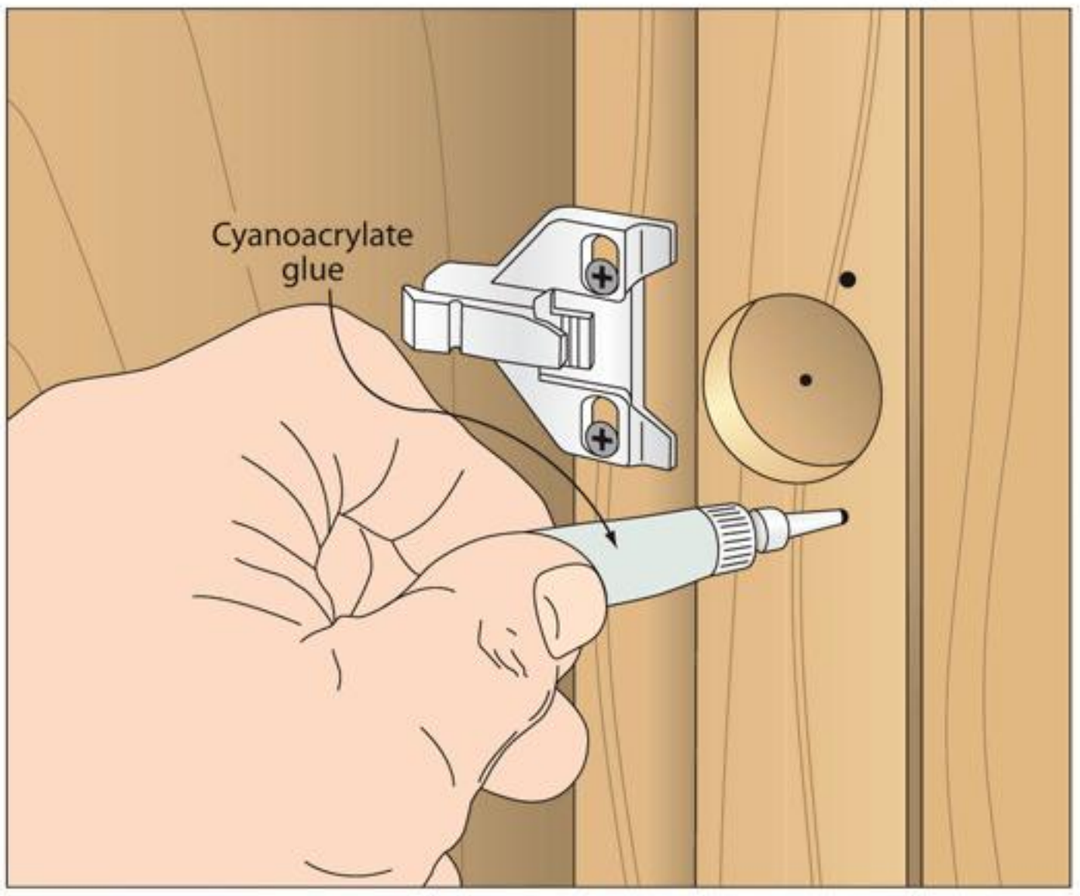
# Shop Tips

## Super-quick fix for stripped screw holes

The small screws needed for hinges strip out pilot holes easily. Fortunately a little cyanoacrylate (CA) glue fixes them just as easily. Simply fill the stripped hole with CA glue, let it cure for a couple minutes, and re-install the screw. It works for any size screw and any type of wood.

*—Erv Roberts, Windsor Heights, Iowa*

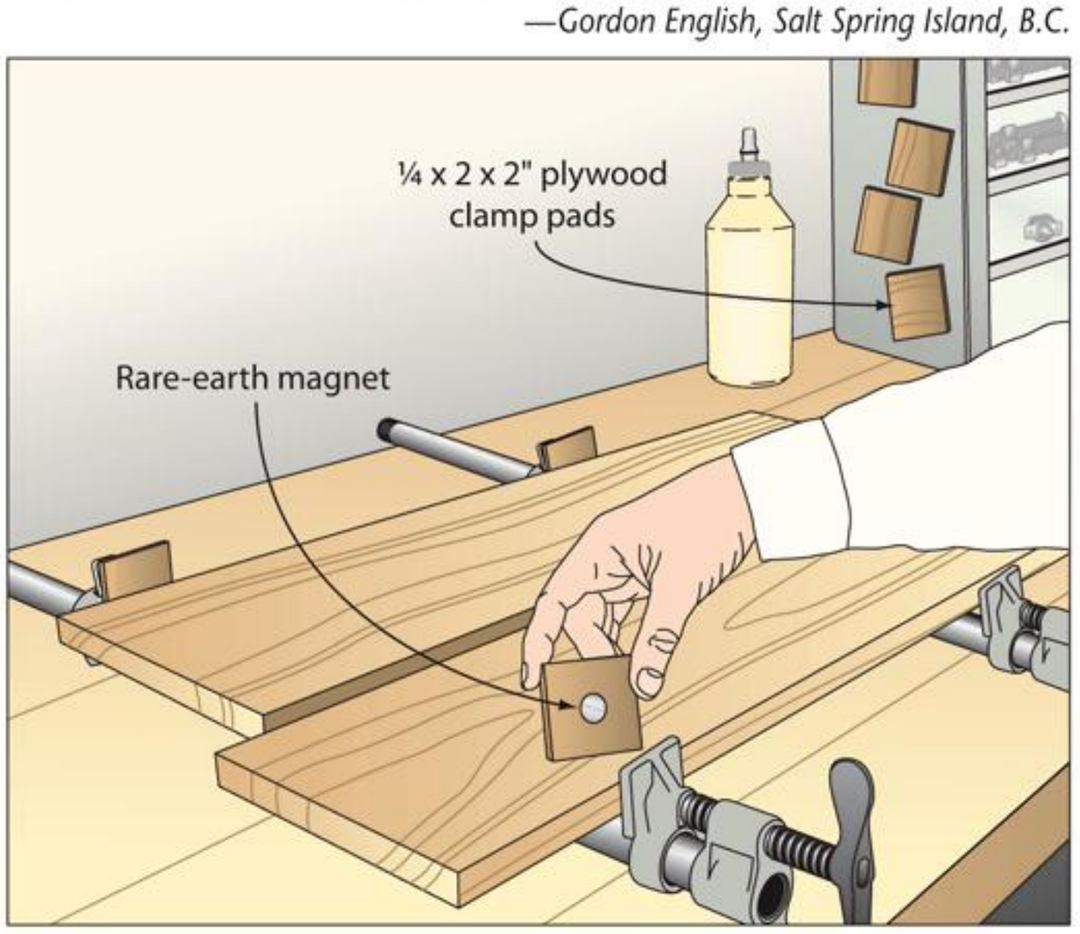



## Predictable pipe clamp pads

You can buy more expensive ones, but pipe clamps are still my "go-to" clamp for large glue-ups. But the Achilles heel of the pipe clamp has always been the challenge of keeping clamp pads in place while you position the jaws. While this task is bad enough for a lay-down glue-up, it's a real headache when gluing vertically. I finally solved the problem by creating the magnetic wooden pads shown below.

To make a batch of pads, start by cutting out 2" squares of ¼" plywood. Next, drill a ½" hole ⅛" deep in the center of each pad. In the hole, epoxy a ½" rare-earth magnet (ten for $9.49, item no. 30810, Rockler, 800-279-4441 or rockler.com). The pads cling to your clamps' jaws, and you can store them on any steel surface in your shop.

*—Gordon English, Salt Spring Island, B.C.*



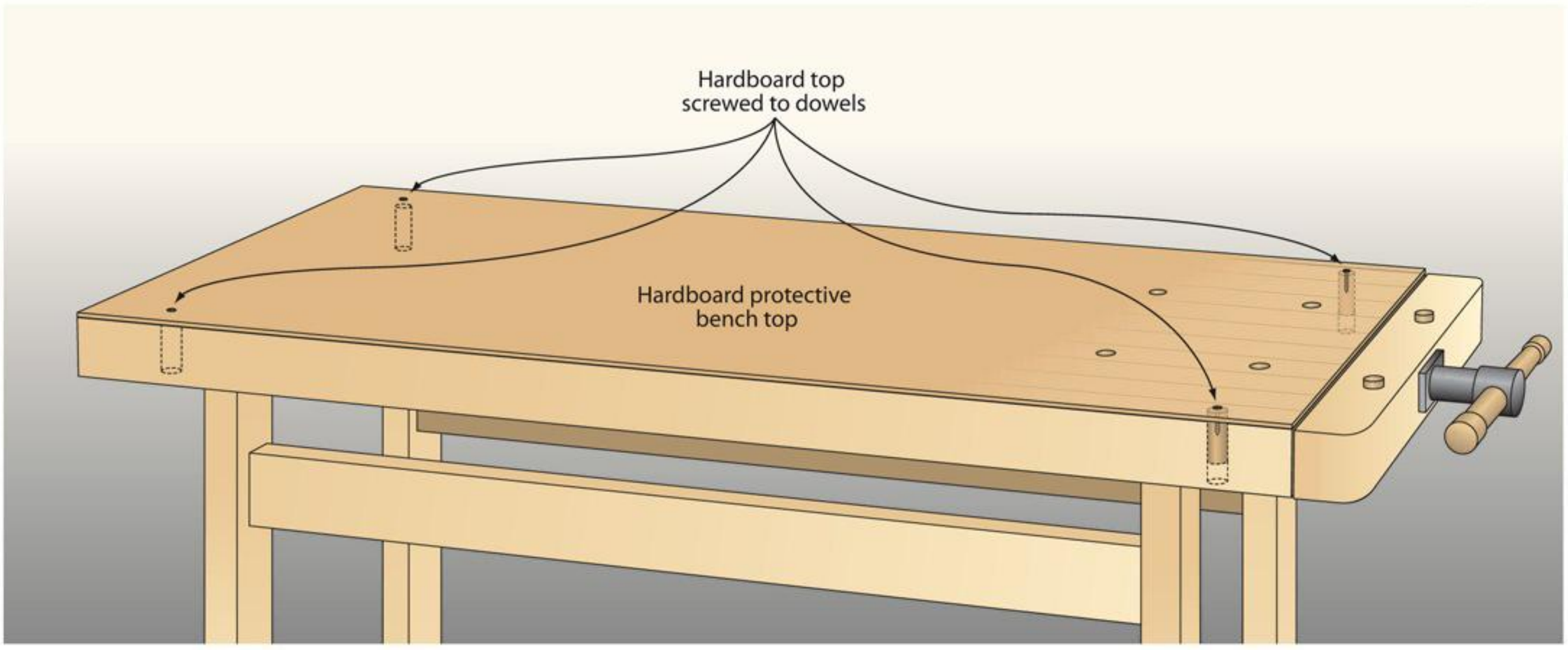
## A hard hat for your benchtop

With all the time and money invested in the solid-maple top of my workbench, I want to protect it for as long as possible. So for potentially damaging tasks, this ¼"-thick, removable hardboard top protects the maple. After cutting it to size, I clamped it to my table and used a Forstner bit to drill up through my bench's dogholes—all but the four in the corners, that is. On those, I just marked the center using the spur of the Forstner bit, and then screwed ¾" dowels, 2" long, centered, on those marks.

Now, I can quickly move the protective top on and off as needed. When it wears out, it is easily replaced.

*—Stan Morgan, Mapleton Depot, Pa.*

*continued on page 12*



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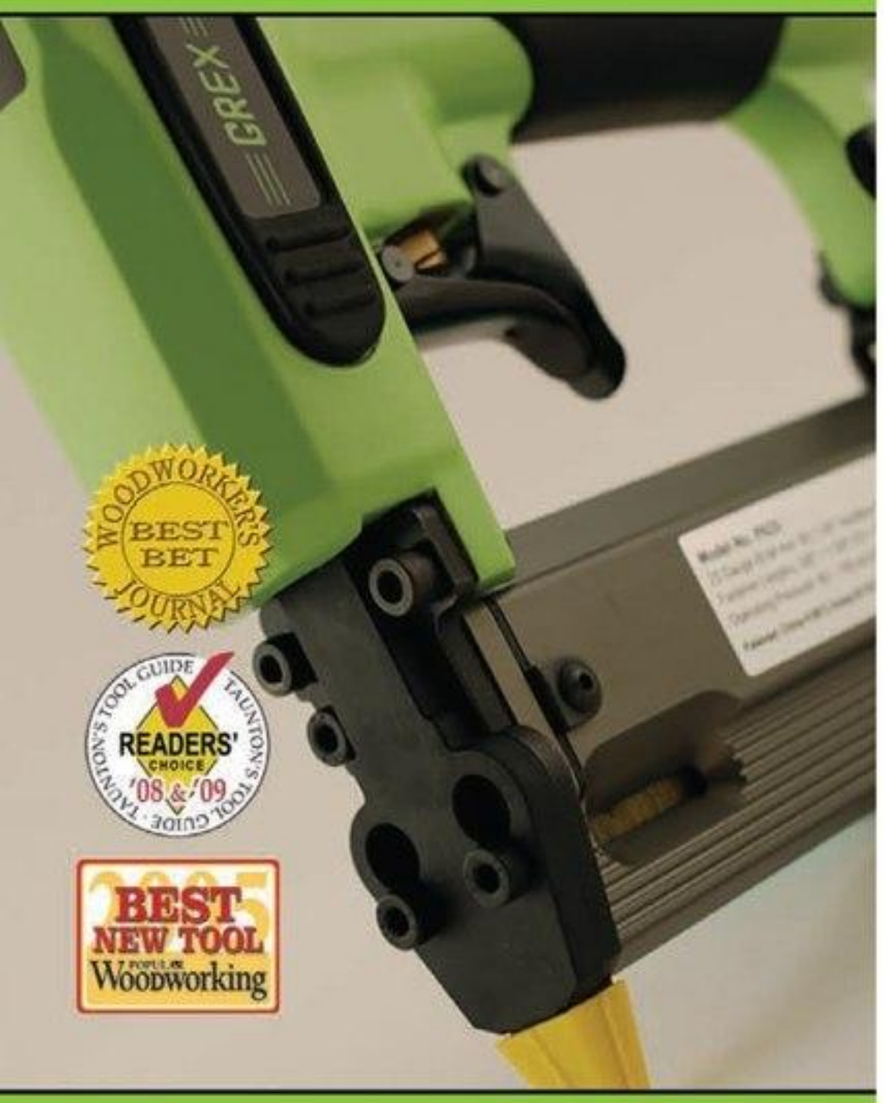


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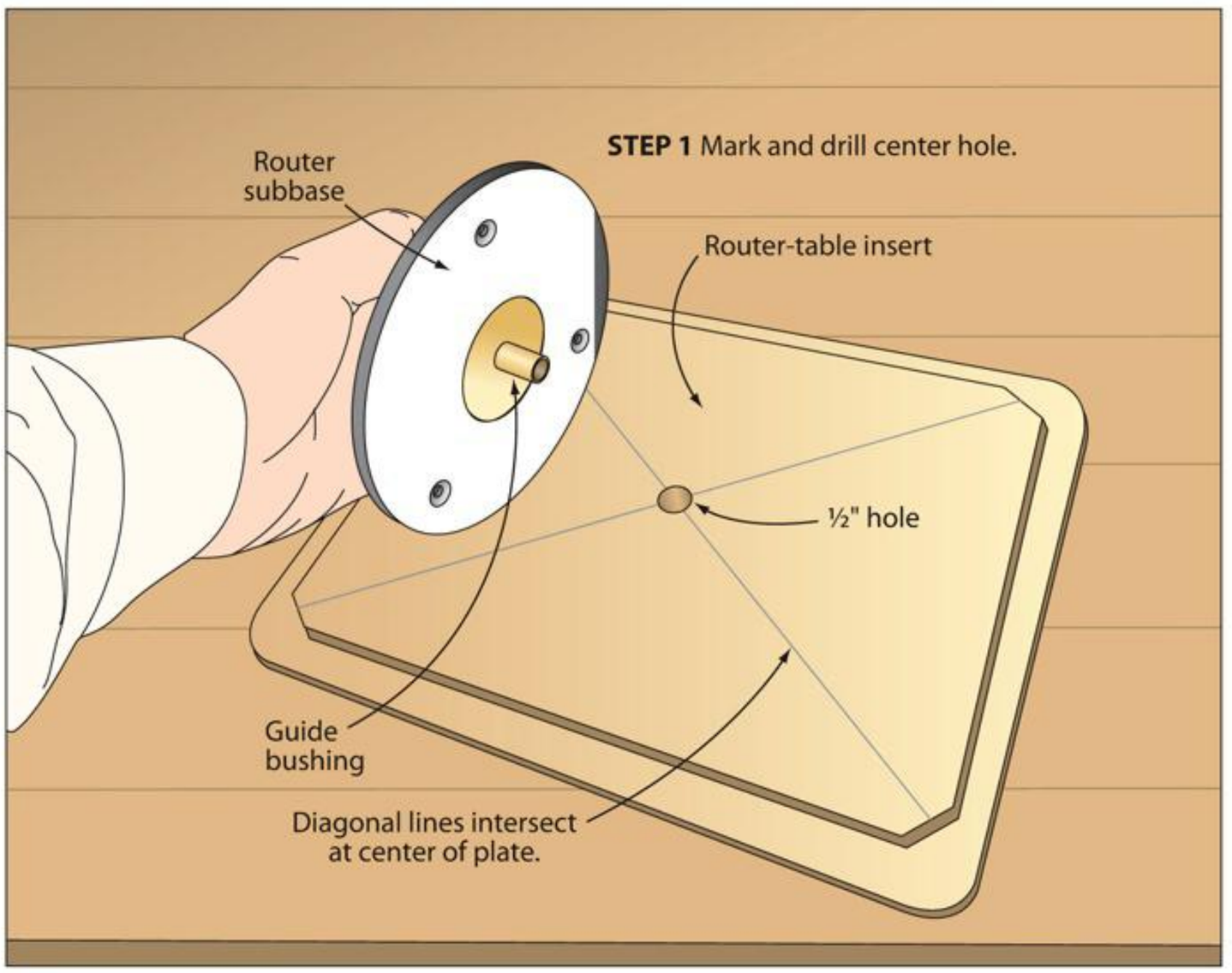
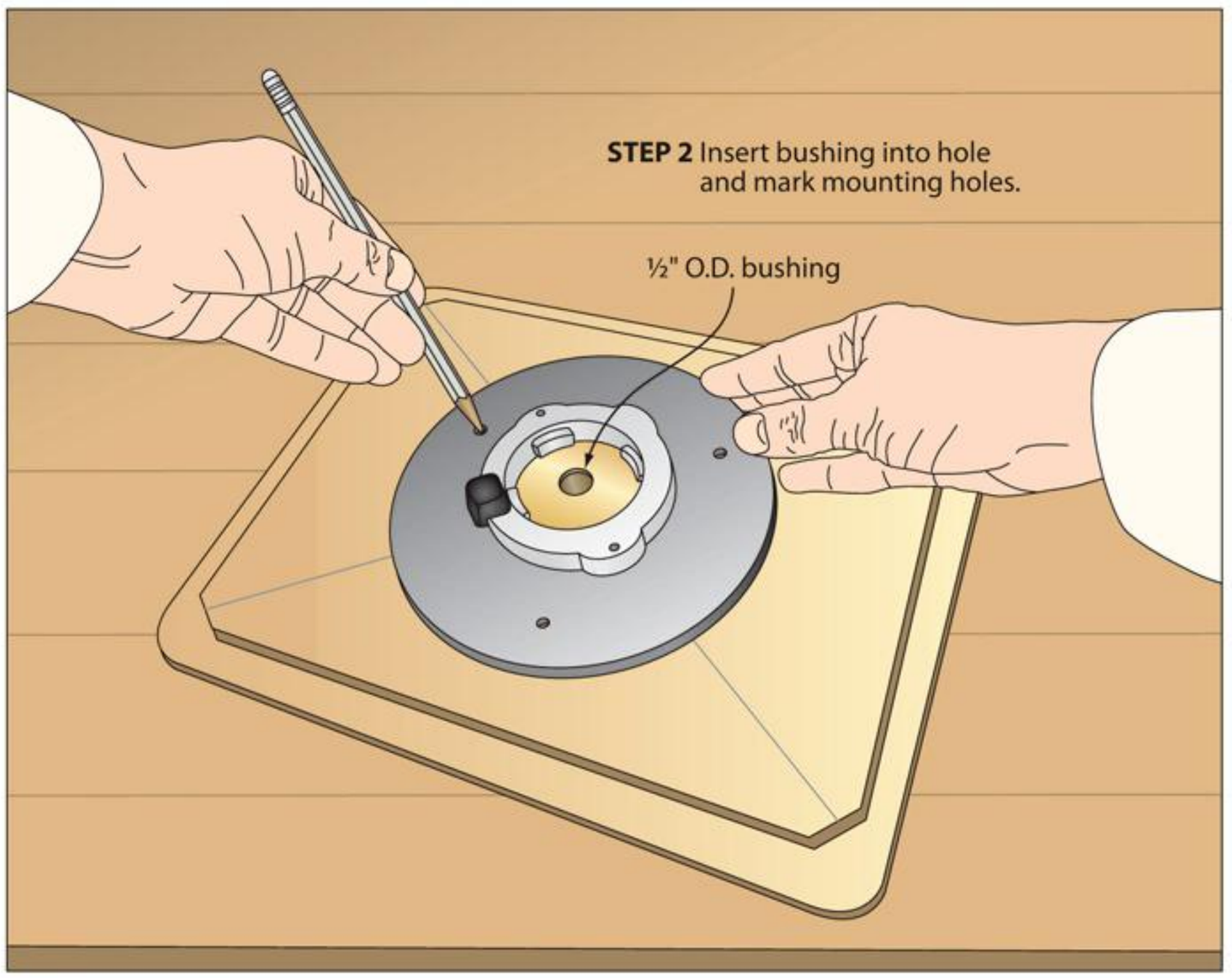
## Shop Tips

### Precisely place routers in insert plates

Here's a quick way to precisely center a router in a router table insert plate. After cutting the insert to the proper size, mark its center and drill a ½" hole there. With a ½" O.D. guide bushing mounted in your router's subbase—without the router attached—fit the bushing into the hole on the bottom of the insert and orient the subbase to ensure that the router controls are in reach and any through-the-table height adjustment holes are toward the front. Mark the locations of the screw holes, drill and countersink to fit the subbase screws, and use a 1½" Forstner bit to enlarge the center hole. Then, mount the router to the insert plate and you're ready to rout.

*—Bob Hunter,* WOOD® *Magazine Tools Editor*



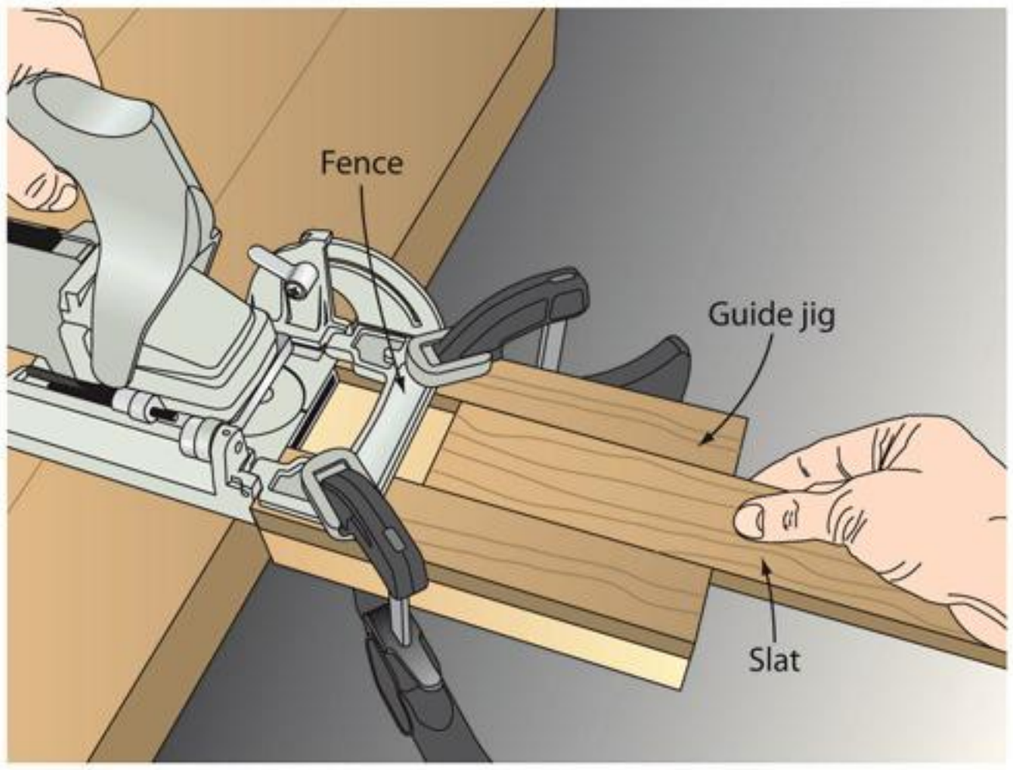



## A recipe for biscuits in thin stock

When I needed to cut biscuit slots in the ends of ⅜" slats, it was necessary to hold them dead-solid and centered to keep the joiner's blade from blowing out a surface of the thin stock.

This guide jig uses a layer of MDF and two pieces of scrap stock to form a workpiece-sized slot that guides the slat end precisely into the joiner.

*—Jim Culler, Bellville, Ohio*

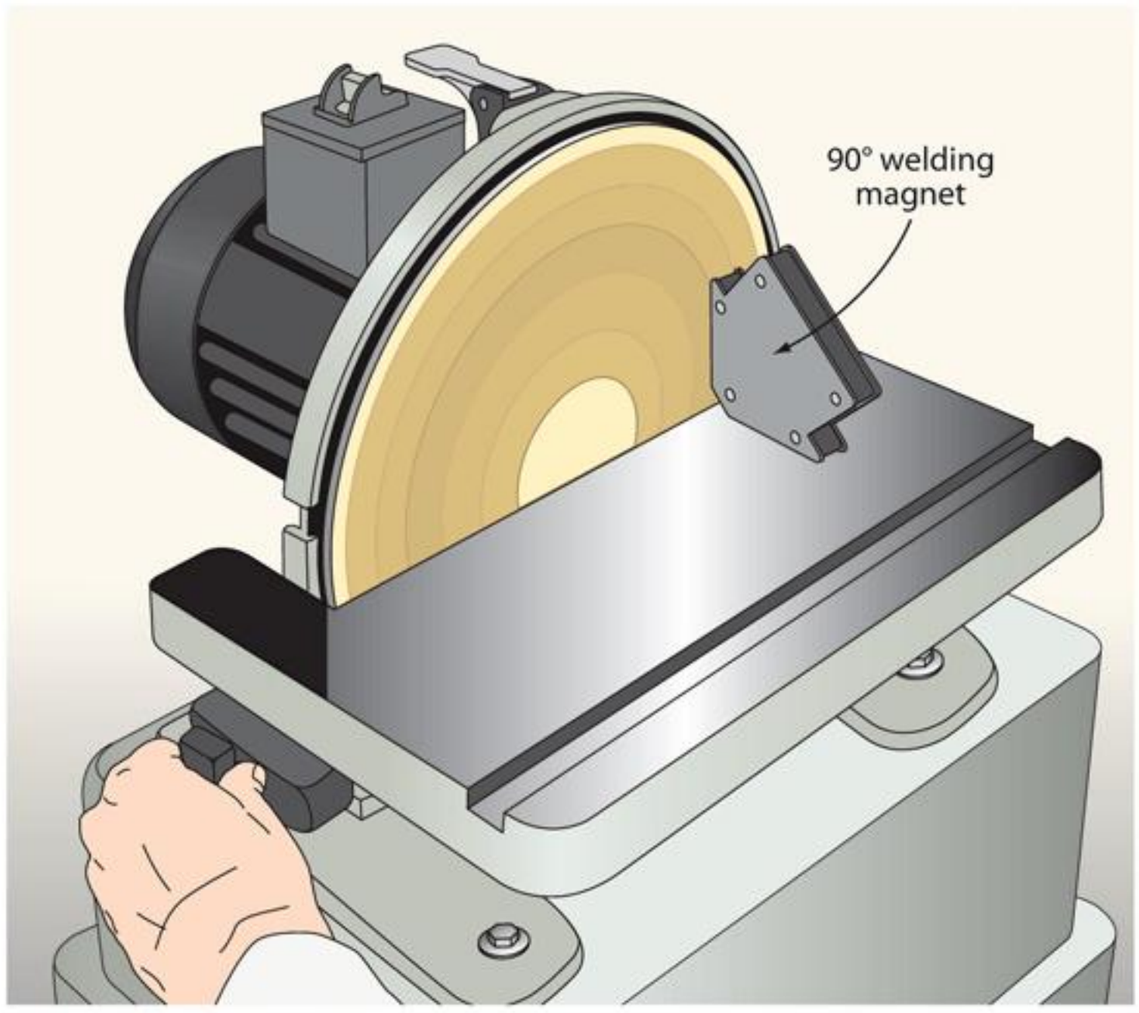



## Just stick, square, and sand

To square my disc sander's table to the disc, I use an inexpensive welding magnet ($4, Harbor Freight, harborfreight.com, item #1939). The powerful magnet holds the table at 90° while I tighten the table-locking bolt.

*—Michael Cyr, Westport, Mass.*

*continued on page 14*







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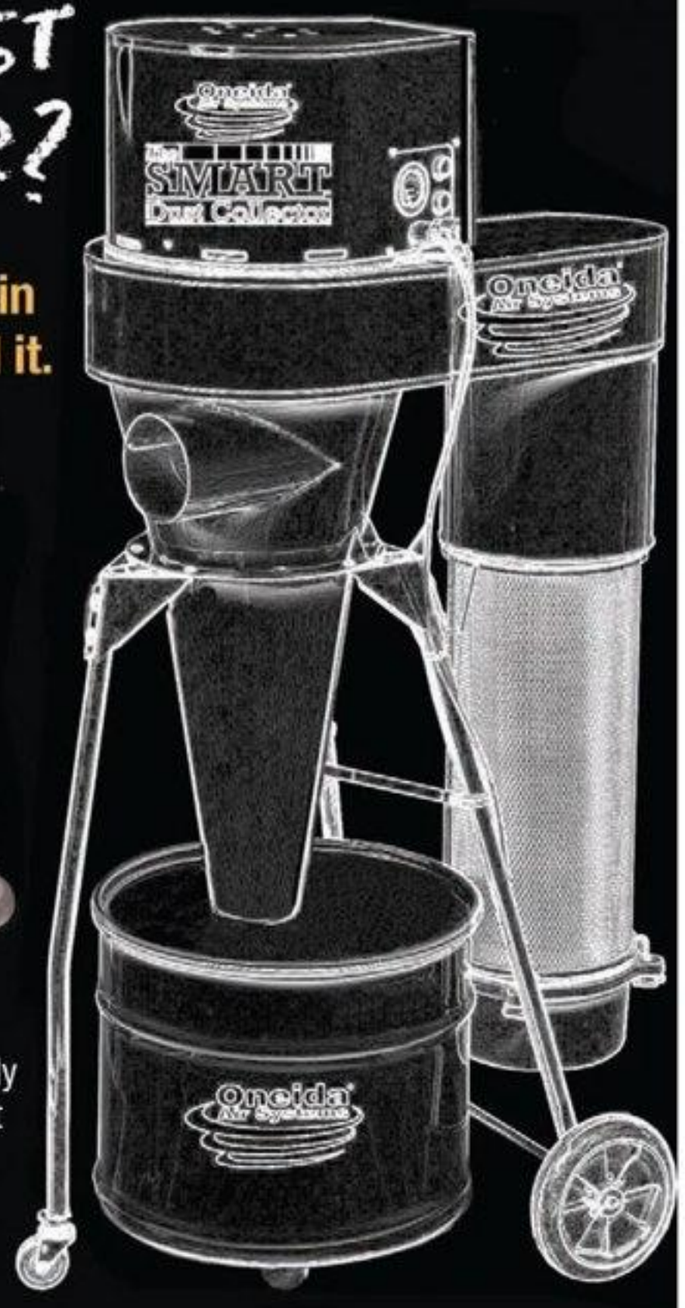


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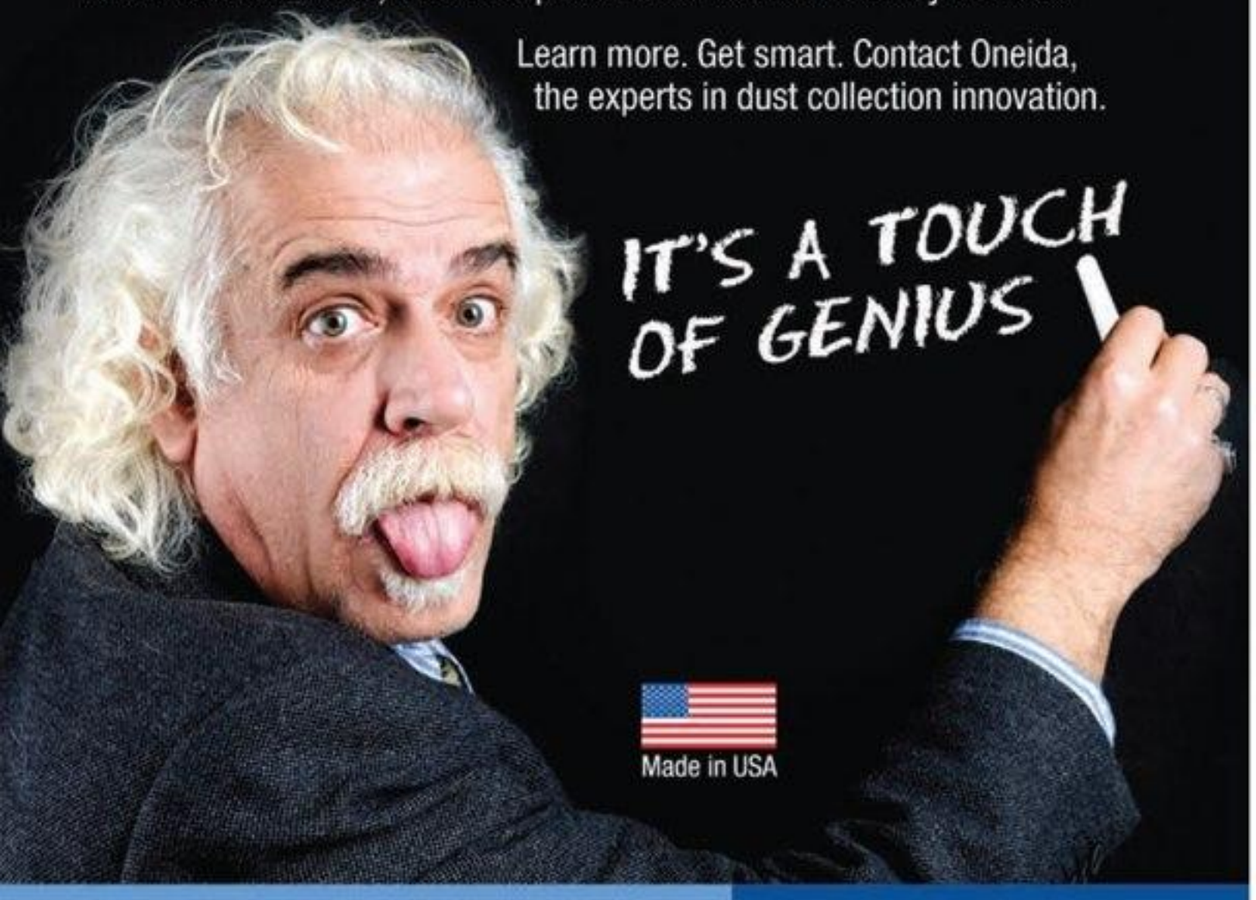


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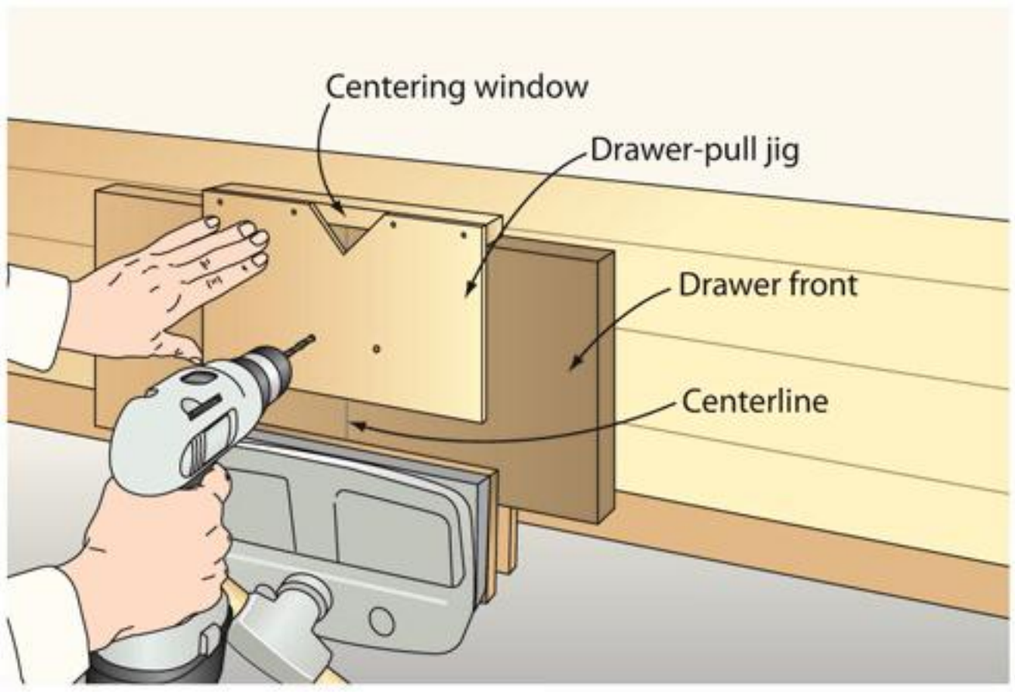
# Shop Tips

## Big "V" pushes pull jig to higher level

As a woodshop teacher, I believe in "jigging up" to make projects easy and repeatable, especially because each operation will be repeated by 20–25 students in each class. That's why I loved your drawer-pull jig in the May 2010 issue (page 16). The version I use in my class has one handy improvement: A V-shaped centering window, as shown, makes the jig work even if the drawers are different sizes. Just center your line in the window, drill, and repeat.

*—Shane Burk, Lubbock, Texas*

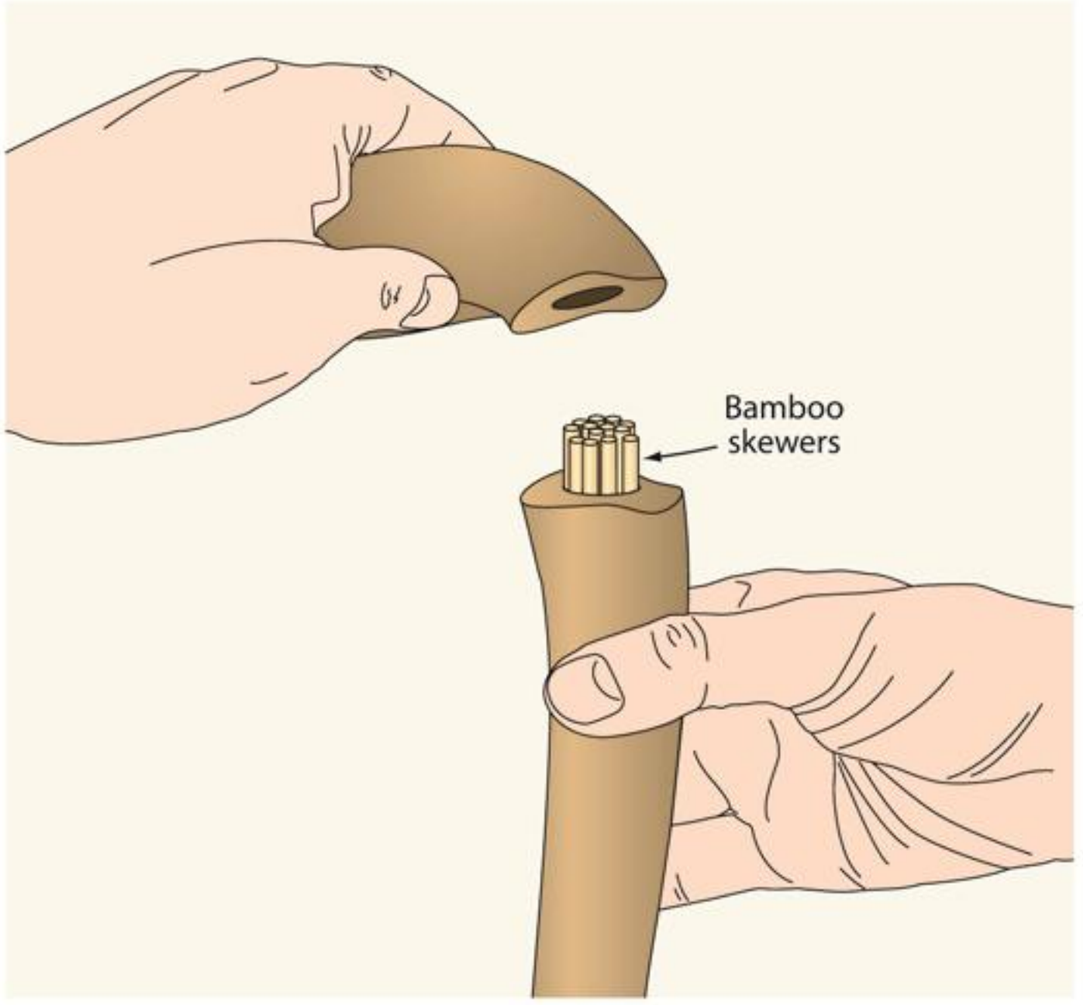



## Skewers help fix an irregular joint

I found a beautiful old walking stick at a second-hand store—a natural growth branch from some exotic hardwood. The handle was broken off and was obviously going to require a dowel, but without a single straight or flat surface, lining up dowel holes proved next to impossible.

So, I drilled holes freehand as straight as possible and improvised a "dowel" from a bundle of bamboo cooking skewers. After adding epoxy to the holes, I poked the bundle in place, and fitted the pieces together. The skewers flex to offset any inaccuracies in my drilling.

*—Thomas Rockey, Northfield, Minn.*

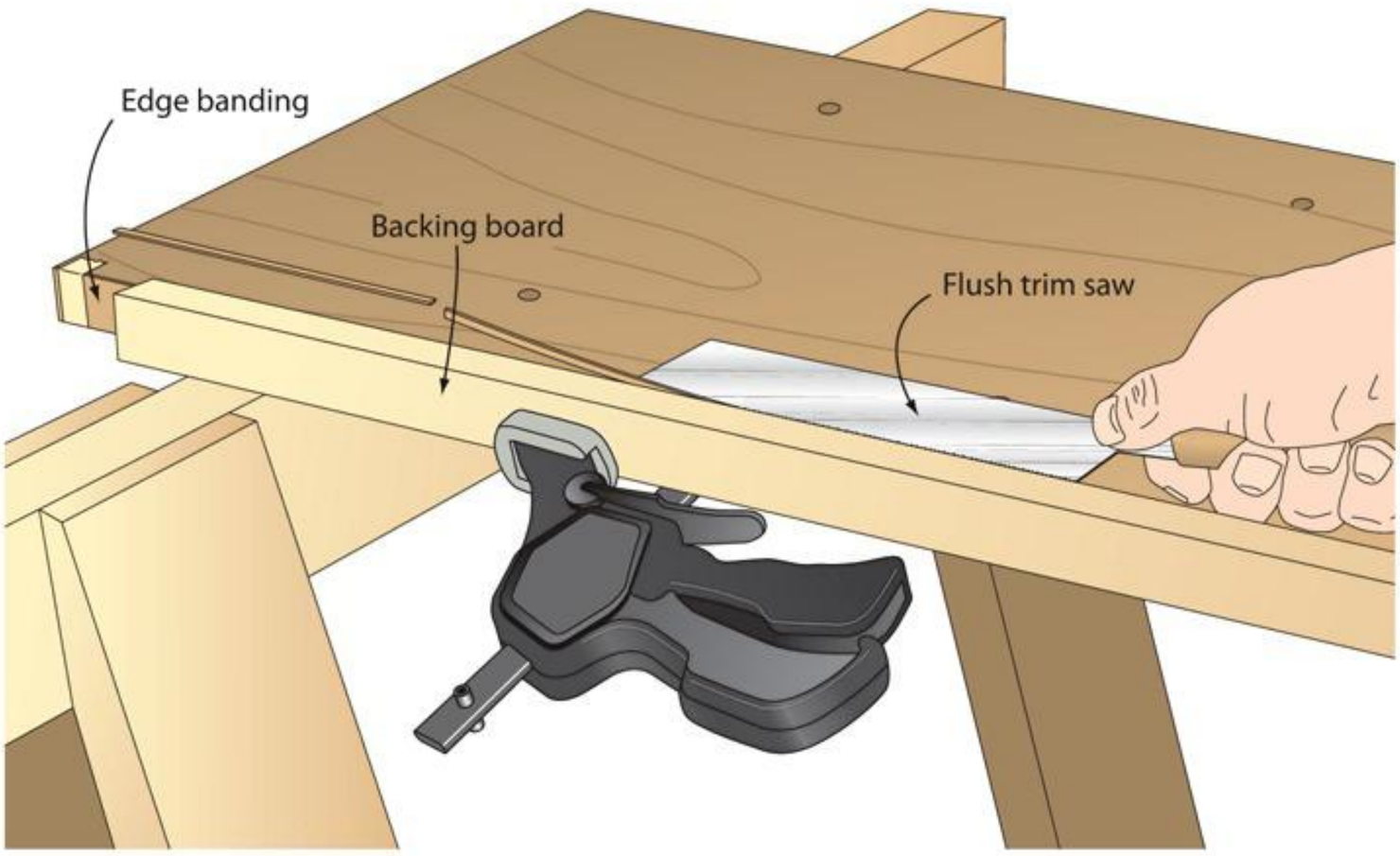


## A fresh use for a flush saw

I've tried every possible method for trimming excess veneer-type edge banding. From commercial trimmers to razor blades, from block planes to sanding blocks, I inevitably either nick the plywood veneer of the shelf or split the banding.

Finally, I thought of using my flush trim saw with a 1" backing board clamped against the edge of the shelf as shown. The excess trim comes off quickly without marring the plywood veneer and the edge banding tidies up easily with a sanding block.

*—Joe Spurlock, North Vernon, Ind.*

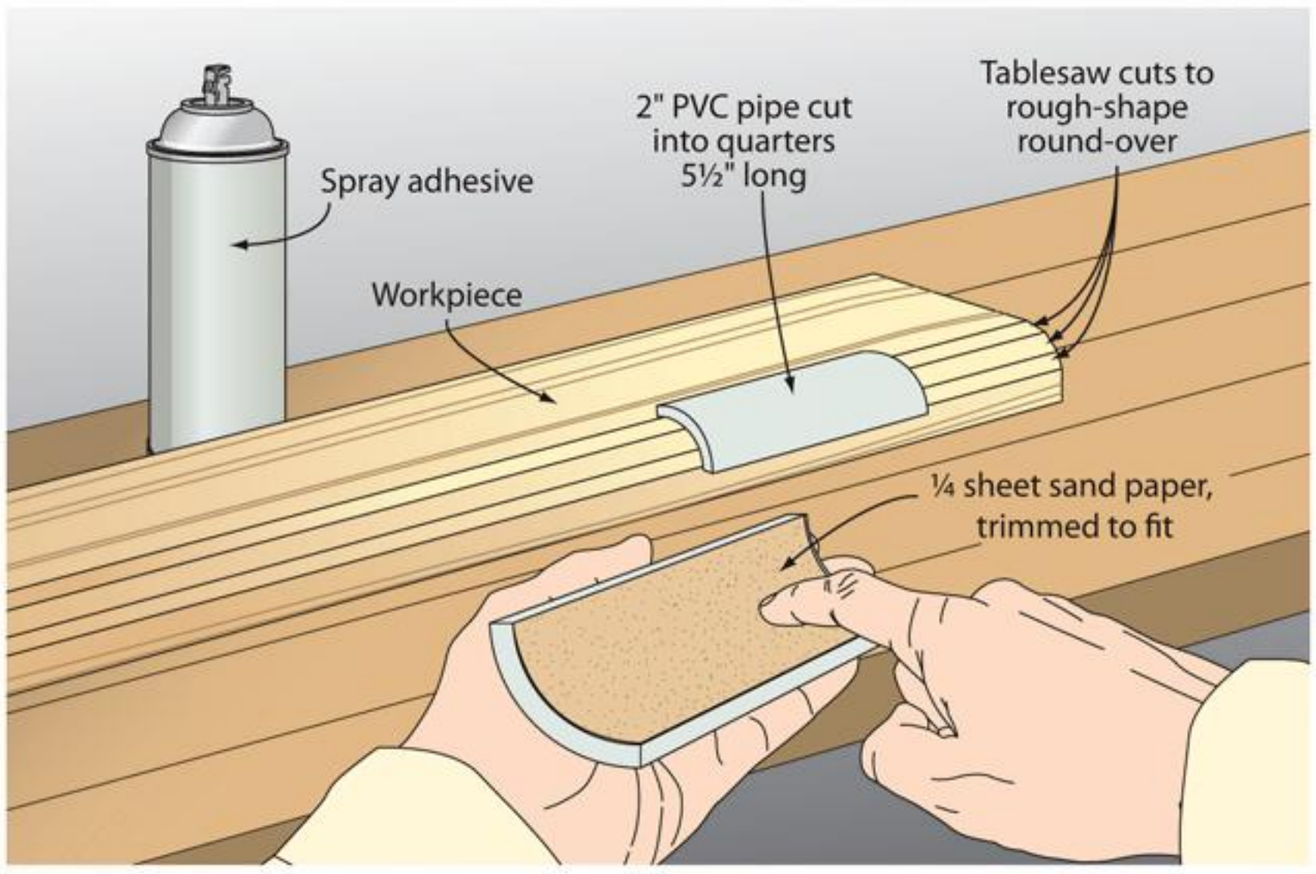


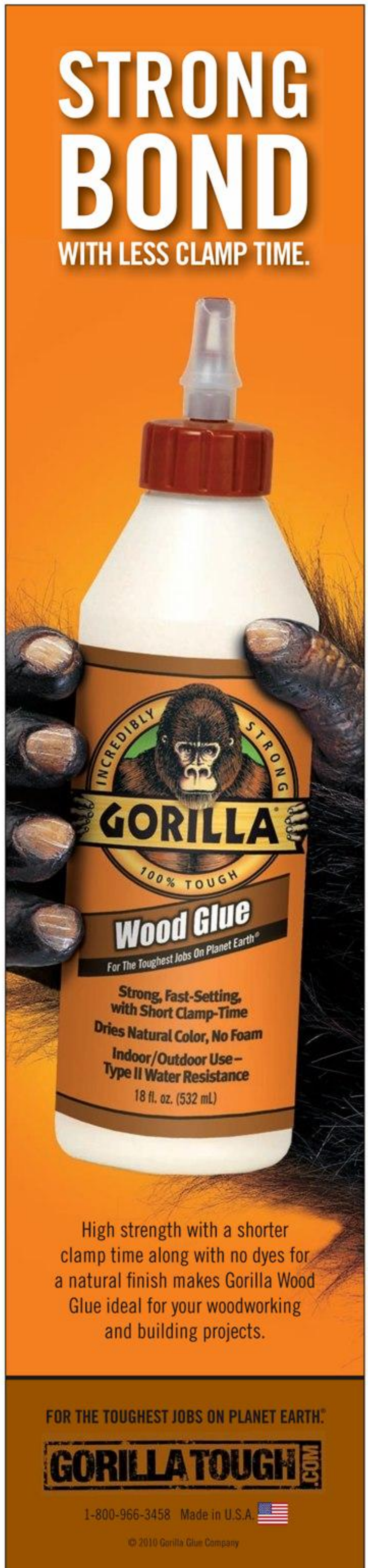

## Big round-overs without big-money bits

Sometimes I'll run into a project plan that calls for a large and expensive round-over bit. Rather than shelling out for a router bit that I might use only once, I turn to PVC pipe for a low-cost solution. It comes in a variety of standard sizes and when quartered on the bandsaw, becomes a quick, curved sanding block. 1½" I.D. pipe yields a ¾" round-over, 2" I.D. pipe yields a 1" round-over, and so on. A 5½" length of the quartered pipe makes a good fit for a quarter sheet of 100-grit sandpaper adhered to the inside with spray adhesive.

To start a large round-over on your workpiece, trim away excess wood from the edge with three angled cuts on the tablesaw—one at 45° and two at 22.5°. Then use your new sanding block to finish smoothing it round.

*—Lenn Heighes, Loveland, Colo.*


Spray adhesive
2" PVC pipe cut into quarters 5½" long
Tablesaw cuts to rough-shape round-over
Workpiece
¼ sheet sand paper, trimmed to fit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# 5 Ideal Applications for Sanding Sealer

If you routinely apply sanding sealer before finishing, you may be taking an extra, unnecessary step. Truth is, any film-forming finish works as a "sealer" because it closes off the pores of the wood and lays a base for the topcoats. So most of the time, you can seal wood using the same finish you'll use for additional coats.

Some situations, however, benefit from a sealer. For example, when refinishing furniture with lacquer or polyurethane, silicone on the surface can cause the new finish to pull away from the contaminated spots—a condition called fisheye. In this case, applying a thin sealer coat of shellac (which isn't affected by silicone) separates the silicone contaminant from the topcoats.

Here are five more ways sanding sealer can save you time and trouble.

**SEAL KNOTS FOR A BETTER BOND**

**Resins in pine and the oily surfaces of some exotic woods, such as teak, prevent film finishes, such as polyurethane, from bonding with the wood. When that happens, the top coat can separate as it did on the strip of tape shown *above*. However, a thin coat of shellac, like the one shown *top*, seals in resins and oils to provide better grip for topcoats. (To choose the appropriate shellac, see the Shop Tip on *page 18*.)**

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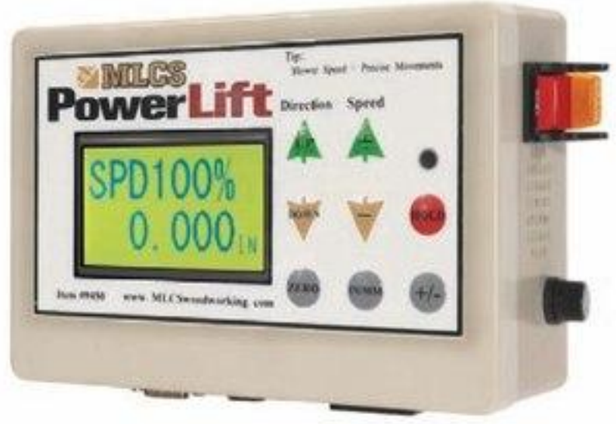


**Only The PowerLift...**
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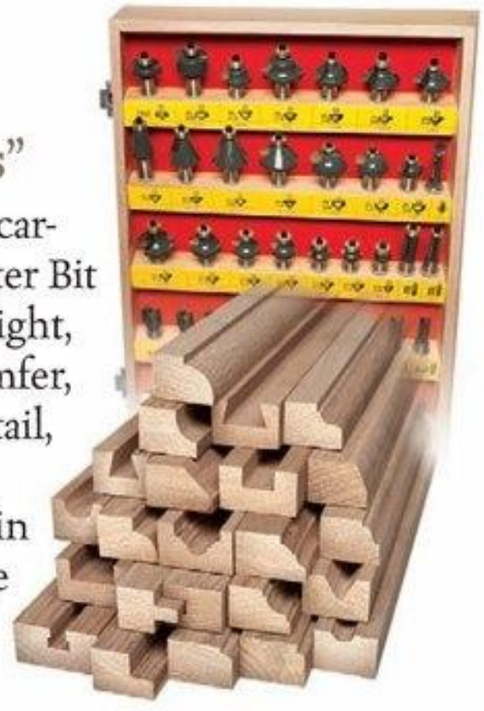

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## STOP THE PAIN OF RAISED GRAIN

**Water-based finishes tend to raise wood fibers more than oil-based finishes, especially on red oak. To minimize grain-raising and make the first coat easier to sand, apply a water-based sanding sealer before spraying or brushing on topcoats.**

## FINISH IN A FLASH WITH A FAST-DRYING SEALER

**Instead of waiting a day between a sealer coat of poly and the first topcoat, speed up the process by first applying a fast-drying sanding sealer. This coat of sanding sealer, for example, dried hard enough to sand in an hour, giving us a jump on the first topcoat.**

## SEAL PORES BEFORE FILLING THEM

**Filling pores helps you achieve an ultra-smooth surface for a high-gloss finish, but tinted pore fillers also color the wood surface. Before applying pore filler, first seal the entire surface using a sanding sealer and lightly sand off any raised grain. Now the excess pore filler will wipe away cleanly, staying only in the pores, without discoloring the wood.**

## KEEP DYE FROM GOING BYE-BYE

**Water-based dye provides a deep color, but unlike stain, it lacks binder to seal it in place. So when you top it with water-based finish, the dye can redissolve and contaminate the topcoat. To lock it in place, apply a thin coat of shellac over the dye. The alcohol in the shellac won't redissolve the dye.**

## SHOP TIP

### Select a dewaxed shellac for strong topcoat bonding

Although shellac can be used as a sealer under almost any other finish, not all shellac works well as a sealer. Unless sold as "dewaxed," shellac can leave behind a surface too slippery to bond with non-shellac finishes—especially polyurethane.

Before you buy premixed shellac, check the label (see example, *below*) to see if the contents can be used beneath other finishes. Or make your own shellac sealer by dissolving 2 oz of dewaxed shellac flakes in 16 oz of denatured alcohol (a 1-lb cut).

**APPLICATION:** Stir well before using. Apply several thin coats with brush, pad or lint-free wiping cloth and let dry 1 hour before sanding with 220 or finer grit sandpaper. Allow any subsequent coats to dry at least 1 hour before sanding lightly and recoating. Not recommended for use as a sealer under polyurethane. When sealing wood under polyurethane finishes, use ***Bulls Eye® SealCoat™***. DO NOT THIN.

**Woodwork:** Apply 1 or more coats. Let dry completely before sanding with 220 or finer grit

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## Just-Right Joinery

# Sliding Mitersaw Joinery

**Use your sliding compound mitersaw to cut accurate joints for outdoor projects. Don't own a slider? See issue 191, page 26, for how to do this with a portable circular saw.**

Sliding mitersaws have pretty much replaced radial-arm saws in woodworking shops and job sites thanks to their lower cost, improved accuracy, and portability. Few users realize, though, that these machines also can make partial-depth cuts, such as those in half-lap joints, dadoes, or rabbets. You'll find a slider especially handy when building large outdoor projects made of hard-to-handle, big—and often wet—lumber.

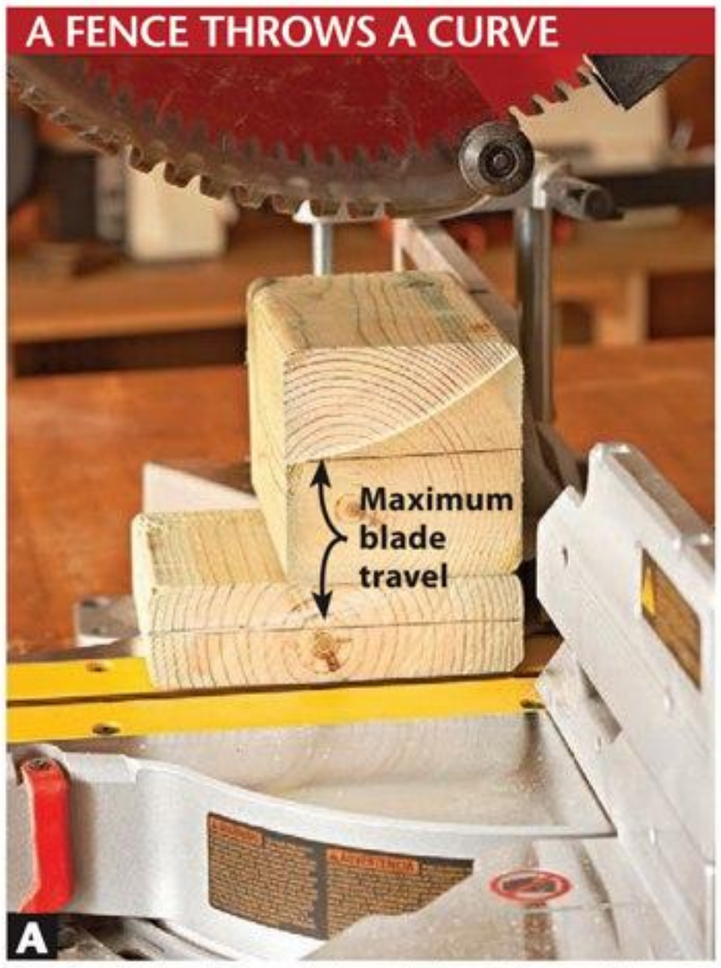
The techniques we'll share here work with either a 10" or 12" sliding compound mitersaw. Before making any cuts, be sure to calibrate your saw's 90° and 45° miter settings using the manufacturer's instructions plus tips from "6 Methods to Maximize Your Mitersaw" on *page 49*. Now, let's make some sawdust.

## Find your saw's limits

For through cuts, all mitersaws are designed to cut just below table level in front of the fence. But when you raise the blade for partial-depth cuts, the curve of the blade no longer reaches the fence [**Photo A**], also reducing crosscutting capacity.

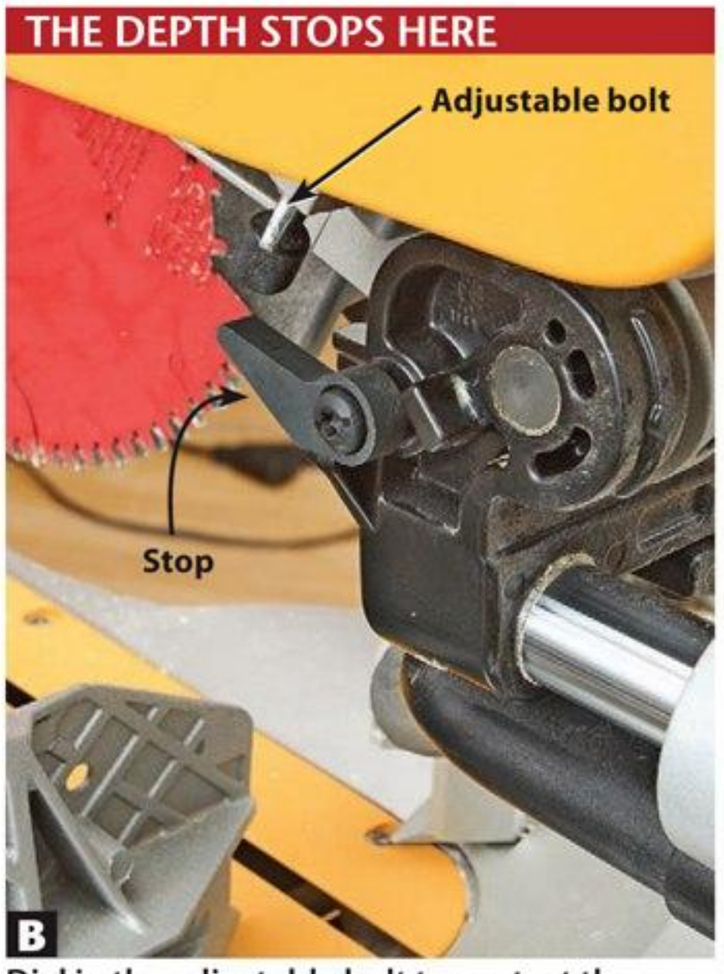
To find exactly where the blade will cut, begin by setting the depth of cut—typically half the part thickness—using the saw's depth stop [**Photo B**]. (See the owner's manual.) Unplug the

**A FENCE THROWS A CURVE**




**A raised blade won't break the plane of the saw's fence, leaving an arced cut on the end of a workpiece held against the fence.**

**THE DEPTH STOPS HERE**




**Dial in the adjustable bolt to contact the stop, effectively limiting the mitersaw's depth of cut.**

*continued on page 22*

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Tip View 1

Tip View 2

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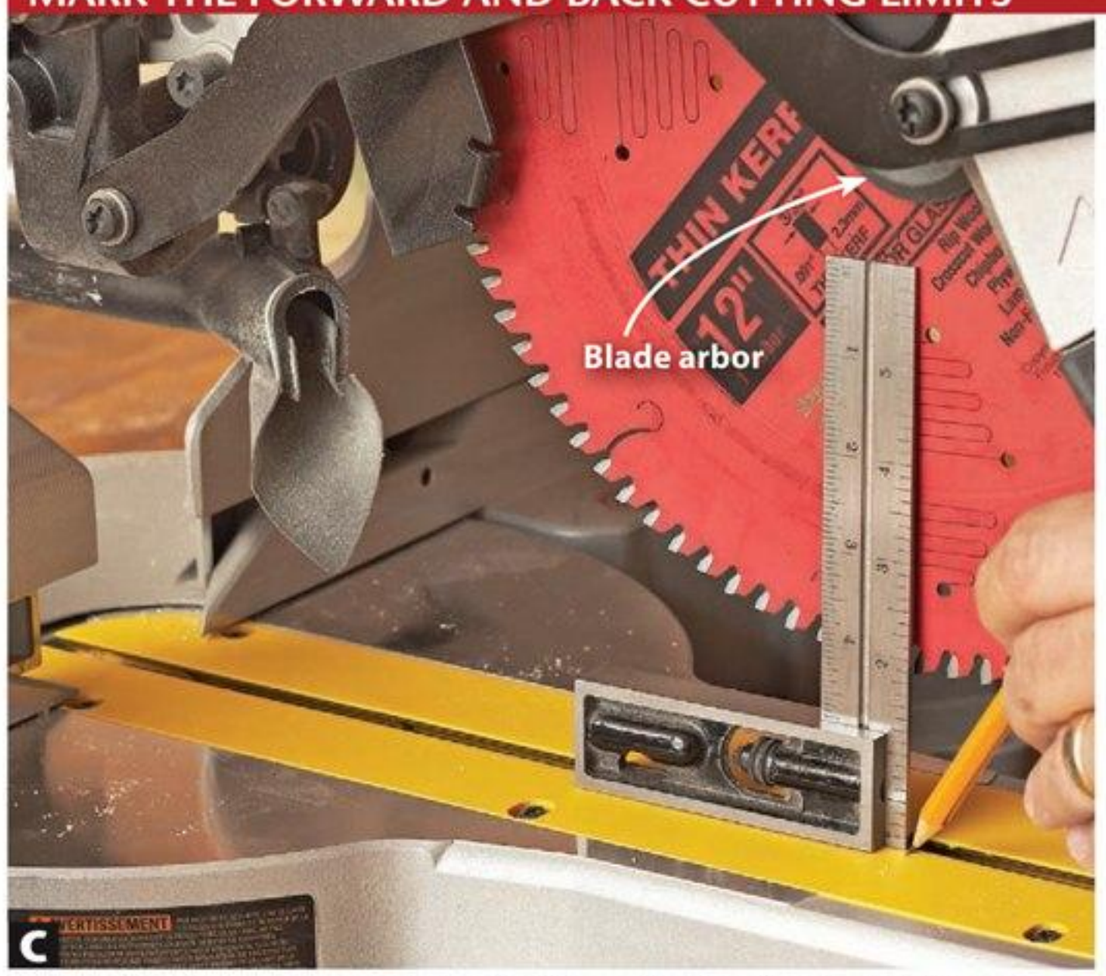
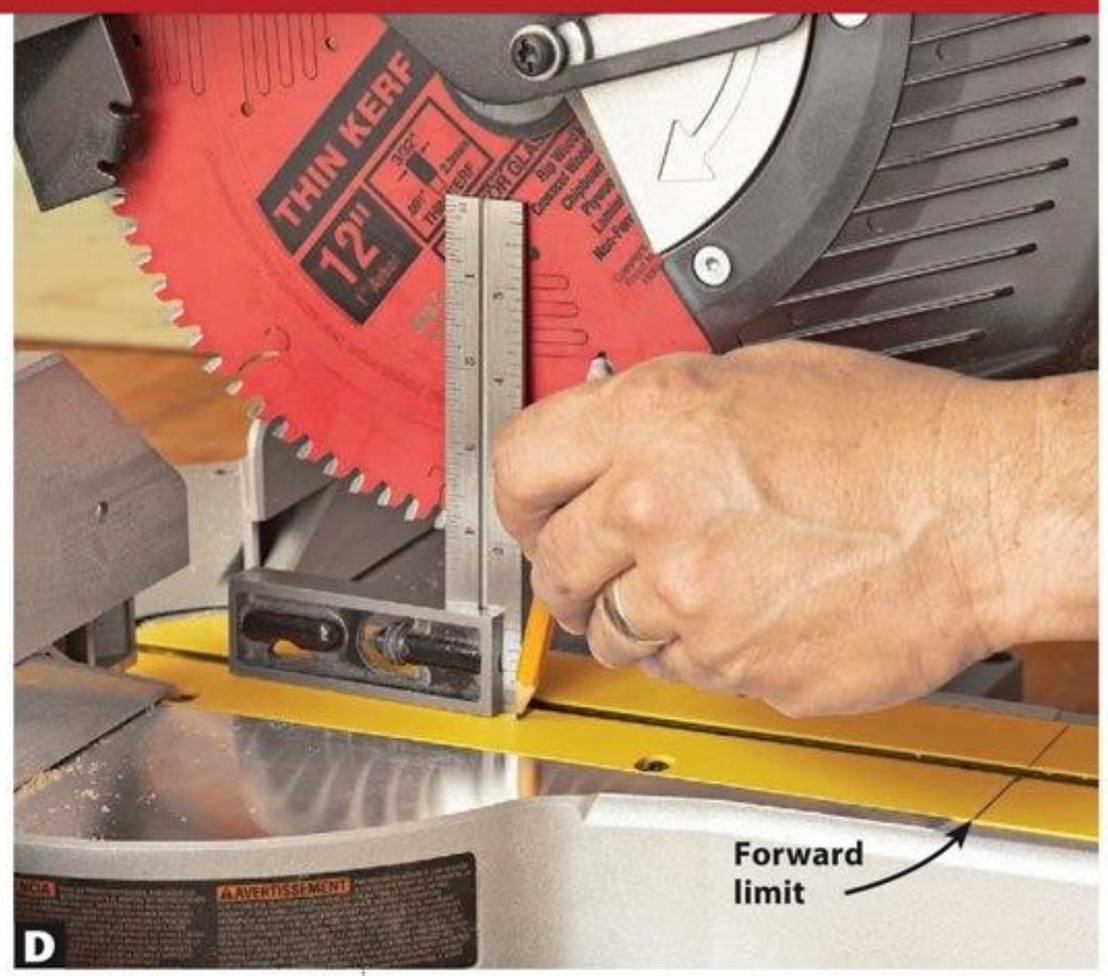
## MARK THE FORWARD AND BACK CUTTING LIMITS




Using a square (or a square scrap of wood), transfer the far-forward arbor location to the saw table and mark it with a pencil.

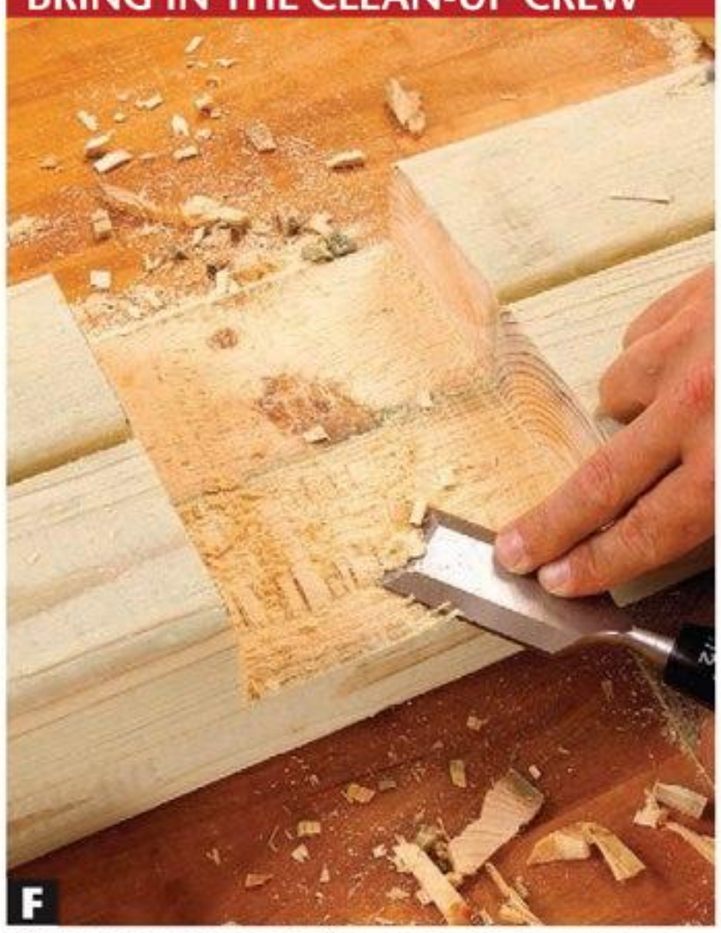



Repeat with the blade pushed back fully. The lines define the maximum width workpiece you can saw this way.

## MULTIPLE KERFS WASTE WOOD

Holding the workpiece against the spacer, remove much of the wood waste from the joint with kerfs spaced about every 3/16".

## BRING IN THE CLEAN-UP CREW




Chisel from the outside edges in to remove stubble left over from the waste wood. This leaves any uneveness hidden inside the joint.

## GOOD FOR OUTDOOR USE

This well-fit joint will look great on a deck, arbor, or other exterior project. As the lumber dries with age, it might open slightly.

saw and pull the blade toward you as far as it will go. Lower the blade to cutting depth and mark the saw table directly below the center of the blade arbor [**Photo C**].

Now push the saw all the way back and mark its blade center [**Photo D**]. The distance between these marks equals your saw's width capacity for that depth of cut. (For our saw, that equals about 6".) Measure from the fence to the back-limit line and rip a scrapwood spacer about 1/16" wider than that dimension. Then use your saw's stock hold-down clamp (or double-faced tape) to secure the spacer against the fence.

### Measure once, and then cut cut cut cut cut

Lay out the half-lap joint on your workpiece and hold it against the spacer.

**Note:** *Depending on the saw, pushing the workpiece out this far from the fence might leave it with little support from the saw table. Supplement with infeed and outfeed support, if neccesary.* Cut a kerf at both ends to define the joint.

Eliminate the waste between the end kerfs by cutting repeated kerfs between them [**Photo E**]. Use a hammer to break off the fingers of waste wood between the end kerfs. Now flatten the bottom of the dado using your widest chisel [**Photo F**], a block plane, or a shoulder or rabbet plane. (See the video listed *below*, for additional details.)

Test the joint for a snug fit [**Photo G**]. For too-tight joints, saw the same amount of waste from both parts until they slide together with light taps from a rubber mallet.

### MORE RESOURCES

**FREE VIDEO**

- "Circular Saw Joinery," woodmagazine.com/circsawjoinery.

**FREE RELATED ARTICLE**

- Cut half-laps and dadoes with a circular saw, woodmagazine.com/cshalflap.

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# Bust Rust

**Got rust on your cast-iron machinery tops? Don't sweat it. Here's how to make them look new again.**

You can easily remove rust in one of two ways: Scrub with a commercial cleaner and an abrasive pad, or power it off using a spinning wire-wheel brush in a drill. Both methods work well, but with key differences you should know about.

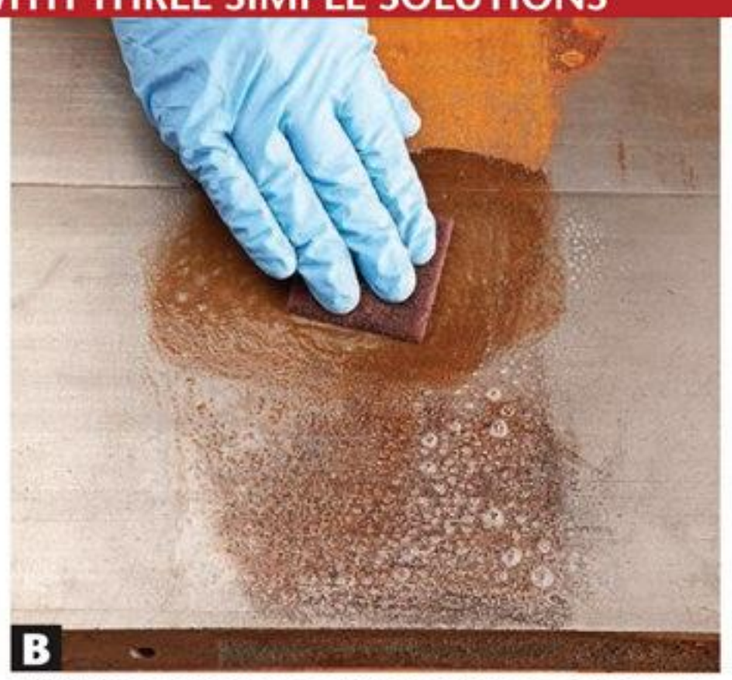
## Cleaners make quick work of even the toughest rust

Empire TopSaver, a commercial product, has a solvent-based, penetrating formula that breaks down rust. You simply spray it onto the affected area and scrub with a scouring pad or steel wool. After a minute or two, wipe away the slurry with a clean towel **[Photo A]**. If any rust remains, repeat the process. TopSaver's formula also has a sealant that works to prevent rust from returning. Although it removes rust effectively, this product does not get rid of dark stains embedded in the cast iron.

Boeshield Rust Free attacks rust with a phosphoric-acid formula, so when applying it wear latex or rubber gloves to prevent skin burns. Spray Rust Free onto affected areas, allow it to penetrate for 30 to 60 seconds, and then scrub with a scouring pad or steel wool **[Photo B]**. (If left on more than a couple of minutes, Rust Free will create dark stains that could become permanent on cast iron.) Repeat if necessary. This product removes the rust as well as dark stains, but it dulls the patina (**[Photo D]** on *page 25*). If you're cleaning only part of the top, this dull look will be noticeable.

## GET NO-RUST CAST IRON QUICKLY WITH THREE SIMPLE SOLUTIONS

Apply TopSaver, then wipe away the rusty residue before the solvent dries, which typically happens in 3 to 5 minutes.




Rust Free bubbles as it penetrates and breaks down the rust. It also emits a strong odor, so work in a well-ventilated area.

Apply moderate downward pressure as you run the drill at top speed. Keep it moving to avoid concentrated scratches.

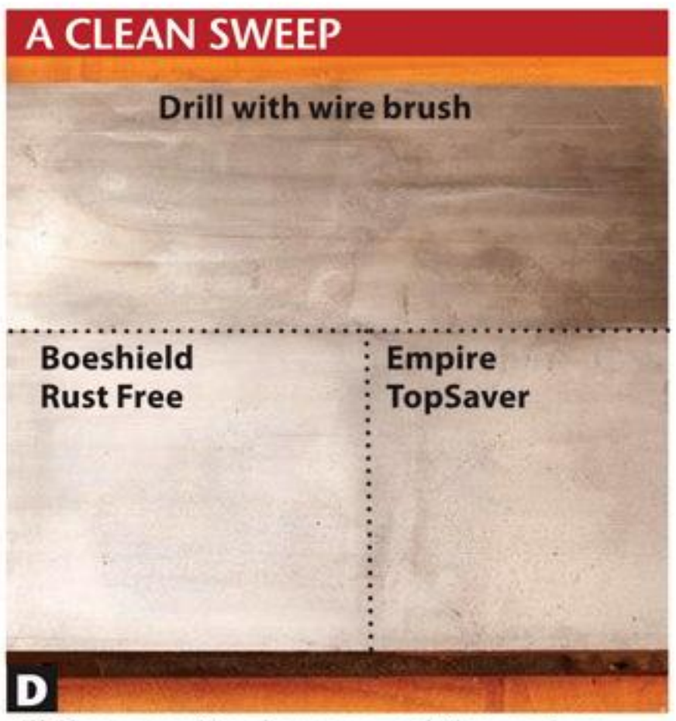
## Power away rust with common shop products

If you don't have either commercial cleaner, use a wire wheel in an electric drill to loosen rust particles (**[Photo C]** on *page 24*). Then wipe the surface clean with acetone. On light rust, this method proves about as quick as the cleaners.

A wire wheel works better than the cleaners on deep rust, though. Keep the spinning brush flat on the surface to avoid scratching the cast iron. If you should create scratches, you can remove them with 400-grit wet/dry sandpaper and a light lubricant such as WD-40. Switch to 800 grit and repeat the process if you still see scratches.

## Now, seal the deal

Once you get your cast-iron top clean, apply a sealer, such as TopSaver or Boeshield T-9, to prevent rust from returning. Do it soon after cleaning; wait until the next day, and you could have quick-forming flash rust to remove. Apply sealer every 2 to 3 months in humid climates, and every 6 months in drier areas.




**All three methods removed the rust on our set of cast-iron tablesaw wings, each requiring about 5 minutes.**

### Sources:

**TopSaver:** 8 oz., $18, Empire Manufacturing, 866-700-5823, empiremfg.com.
**Boeshield Rust Free:** 8 oz., $11, PMS Products, 800-962-1732, boeshield.com.
**Boeshield T-9:** 12 oz., $14, PMS Products, 800-962-1732, boeshield.com.

# The Shop Monkey

Don't be afraid... he's trained.

# Living in the Present

## Keep your sanity during the holidays.

**Unless you've successfully tried the tricky scrollsawing *WOOD* reader Don Stotts used to "curl" the wooden ribbon on this gift box, don't attempt it under a time crunch.**

It's the most wonderful time of the year! Oh, who am I kidding? More like the busiest and most stressful time of the year. Travel plans. School recitals. Gift shopping... It's enough to make you want to forget the holidays and go hide in the corner.

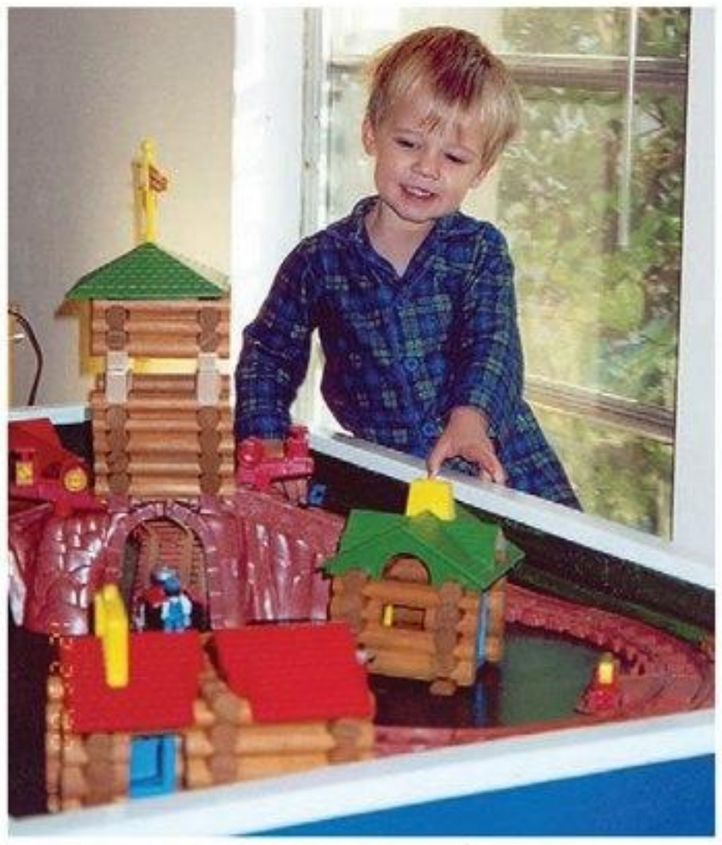
For us woodworkers, the pressure ratchets up even more. Friends and relatives drop hints about receiving something special from your shop. A cutting board. A picture frame. A Chippendale highboy with hand-carved ball-and-claw feet, brass drawer pulls and a flawless French polish...

After many years of offering—and being volunteered—to build holiday gifts, I offer the three most important gifting rules:

**1 *Start early.*** Every calendar has the holiday dates marked on them. So why do we often find ourselves sweating the last details (or whether the finish will actually be dry) mere hours before the gifts are to be given?

Instead, find gift plans and gather all of the supplies well in advance—no later than mid-November—and set milestones for yourself to keep the projects on track.

**2 *Build it small.*** Every summer, I picture myself building big holiday presents and saying, "Oh, it was nothing," as the recipients literally leap with joy. The reality is always quite different. Like the year I built a doll cradle for my mom, only to find it was too large to carry on the plane, and too expensive to ship.



**While making this play table for his nephew Tyler, the Shop Monkey had to work through a serious cold to meet his holiday deadline.**

Before you start a gift, compare its finished dimensions to the sizes of flat-rate shipping boxes. Although this limits project size, it saves a lot of hassle when sending those items on their merry way.

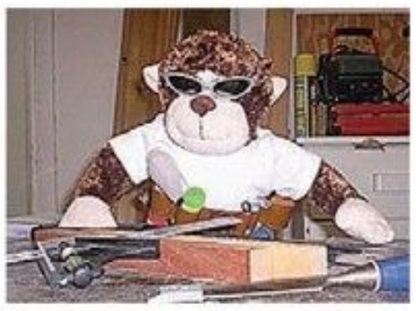
**3 *Stick to the known.*** Wanna impress relatives (and build skills) with some fancy joinery you've never tried before? This probably isn't the time. It may seem like just a simple twist on a classic joint, but can put you in a serious time jam. And with all the other commitments during the holidays...

My advice: Fall back on tried-and-true methods. If a project plan uses new techniques, simplify it with a less complicated method, or make a different gift altogether.

**The Shop Monkey actually expected to travel with this doll cradle as carry-on baggage on an airplane one year.**

Finally, remember that building holiday gifts for others is a labor of love. It's not the project itself that matters, but the time, talent, and care put into it that will always show how much you care about the recipient.

And, isn't that what the holidays are all about?



***The Shop Monkey***

*(aka Tom Iovino of Tampa, Fla.) blogs prolifically at woodmagazine.com/shopmonkey.*

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# Why it pays to Buy Good Plywood

Is it your imagination or is good plywood getting harder to find? Not if you shop smartly. Armed with these buying tips, you'll sort the stack like a pro to pick the perfect plywood for your next project.

## It's what's inside that matters

When evaluating a sheet of plywood, start by looking at its edge. Thin veneers of wood, glued and pressed with crossing grain directions—transform humble core woods into sheets that are wider, flatter, and more dimensionally stable than anything found in nature. But modern plywood manufacturing, especially overseas, has shifted from birch-only cores to other often-inferior woods at the expense of core quality and stability.

When examining plywood, ask yourself: Are the layers straight, of a consistent thickness, and free of large voids? Irregularities in the core veneers can telegraph through to the thin face veneer and broadcast themselves during sanding and finishing.

Sight along the edge to check the sheet's straightness. A bow indicates unevenly dried core material that only warps more, as cutting the sheet releases internal tension.

Although the 13-ply construction of the leftmost sample is more forgiving of the overlapping core layers and voids than standard 7-ply sheets [**Photo A**, *next page*], the defects in this sheet are severe enough to telegraph as an undulating face, especially with a glossy finish. The superthin face veneers, around 1/50", would make sand-through difficult to avoid, and cross-cut splintering a near certainty. In comparison, we'd have no such reservations with the second sheet.

One alternative to traditional veneer-core plywood, combination-core plywood, at *right*, eliminates worries about inconsistency and flatness by retaining the three center veneer plies and replacing the outer plies with medium density fiberboard (MDF). The MDF provides a smooth and flat surface immediately below the veneer faces.

**This C3-graded red-oak plywood was sold in the home center as "cabinet-" or "furniture-grade" plywood. At a quick glance, the rotary-cut faces look decent. But close inspection of the edges reveals uneven core veneers, large voids, and a distinct curl.**

## Face facts

As strong as plywood must be on the inside, it must also be pretty on the outside. Plywood grading, as much aesthetic art as science, designates one face as the front and one as the back; grading is on separate scales. Most domestic hardwood plywood manufacturers use the Hardwood Plywood and Veneer Association's (HPVA) voluntary standards for grading. The front face, judged for uniformity of color and consistency of grain, receives an AA, A, B, C, D, or E grade; see chart on *next page*. For the back face, the grade is designated 1, 2, 3, or 4, with respectively less-restrictive allowances for defects and repairs.

Unless you need ultra-high-end (and high-cost) AA-graded hardwood plywood, stick with A1, A2, B1, or B2 for furniture or cabinets with visible faces. Rarely will a hardwood plywood dealer carry more than a handful of grades. Rather, at a well-stocked dealer, you'll find a selection consisting of a good-on-two-sides (G2S) grade, such as A1, alongside a lesser grade, such as B2, often in multiple species. A good-on-one-side (G1S) grade, like A4, might also be on hand, but retailers often only stock this in ¼" for case backs. Locally, we found ¾" A1 red oak plywood for $70 per sheet, B2 for $60, and ¼" A4 for $36.

As you shop, keep in mind that softwood plywood for industrial and construction use is graded under a different system, with a two-letter grade—AB, BC, CD, etc.—along with an exposure rating. You often can find both the hardwood and softwood grading systems directly across the aisle from each other at the home center, so don't mix up the two.

Most domestic manufacturers stamp the grade directly on the plywood edge, but increasingly, foreign plywood comes without such a stamp. Confusing the matter further, many retailers prefer to use marketing terms such as "cabinet grade," "furniture grade," or "stain grade." When in doubt, explain your project to your plywood dealer and let him steer you to the proper grade for your applica-

**Manufacturers of A1-graded plywood don't skimp on the core materials. This hardwood-store-bought sheet has consistently even core veneers and a plainsawn, slip-matched face. The price, 50% costlier than C3, *left*, is justified for projects that display both faces.**

## SORTING OUT PLYWOOD GRADES

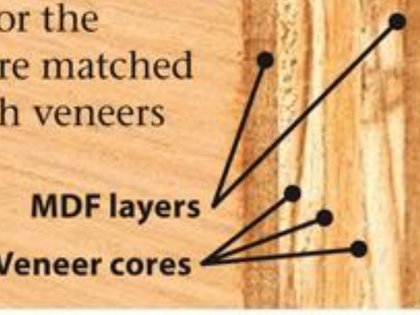
| Front-face grade | Appearance | Back-face grade | Appearance |
|---|---|---|---|
| AA | Grain-matched face-veneer pieces show little contrast between pieces. Defects, if present at all, are nearly unnoticeable. Often special-ordered for high-end architectural installations. | 1 | Color variations and tight knots are allowed, but defects must be filled or repaired. A grade-1 back is approximately equal to a C or D face. |
| A | Excellent for furniture, A-graded faces are similar to AA in quality. Any leaves are spliced for a pleasing blending of grain and color. Minor burls and pin knots are allowed but uncommon. | 2 | Color variations are not taken into account. May contain sound knots of less than ¾" in diameter. |
| B | B is also useful for visible faces of furniture and cabinets, but will often display defects characteristic of the face-veneer's species. | 3 | Knotholes up to 1" in diameter permitted. |
| C, D, E | Respectively, larger defects, color variations, and repairs are allowed, but the grade is sound. These grades should be used where the face will be painted, or hidden altogether. | 4 | Allows many open defects. For use where the back will be hidden. |

tion. But no matter the grader's judgment, check both faces to make sure they make *your* grade.

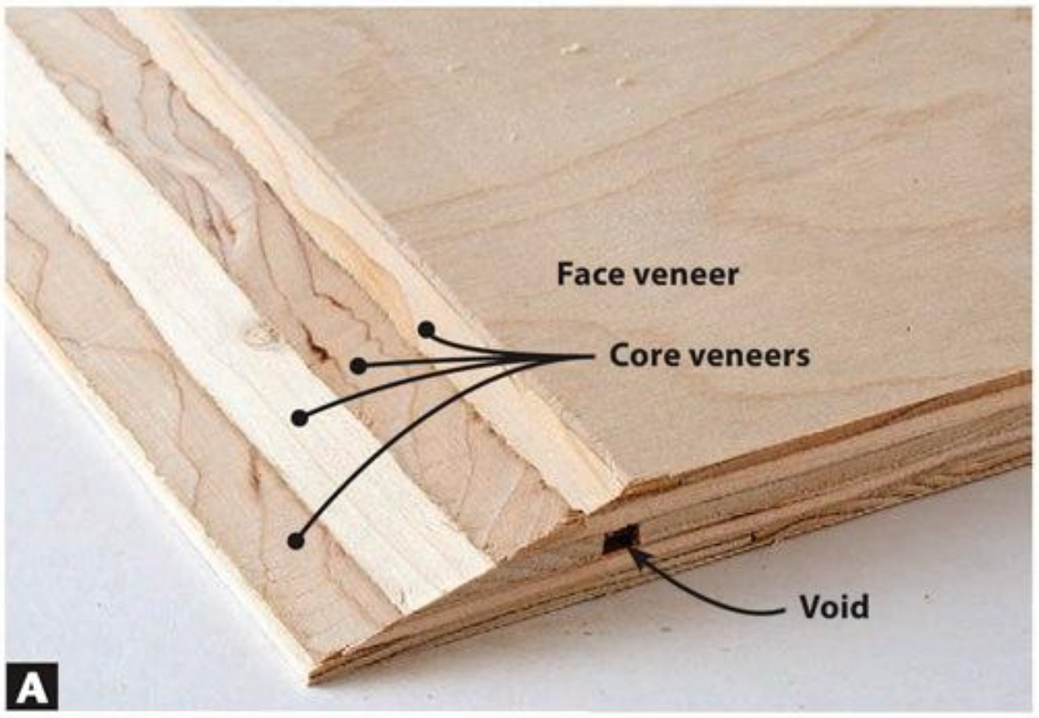
Much like hardwood, hardwood plywood comes in plain-sliced, riftsawn, and quarter cuts. But unlike hardwood, face veneer can also be rotary-sliced, a method in which the veneer is peeled off spinning logs, like a roll of toilet paper. This produces an unnatural, wide, swooping grain pattern [**Photo B**], but generally yields the most veneer of the cutting methods, producing the least-expensive sheet.

For non-rotary-cut face veneers, look for the glue-up pattern where the face veneers are matched on the plywood core, as you might match veneers on your own project [**Photo C and D**].

Written by: **Lucas Peters**




**Combination-core plywoods combine the best qualities of veneer-core plywood (rigidity and screw-holding power) with MDF-core products (surface flatness and dimensional consistency) into a furniture-friendly sheet.**




**Thick face veneers of around 1/36" help compensate for any voids or thickness inconsistencies in the core veneers.**

**Rotary-cut veneer often produces an unbroken layer of veneer across an entire sheet of plywood that can look unnatural.**

**In a slip-matched face, subsequent pieces of veneer from the log are "slipped" out side-by-side to form a repeating grain pattern.**

**In a book-matched face, every other piece of veneer from the log is flipped, creating a mirrored-grain effect.**

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# This face launched 1,000 projects.

**Graham Blackburn** has been building houses and furniture, and writing and illustrating books on all aspects of furniture for more than thirty years. He currently teaches at schools and woodworking shows across the country and runs Blackburn Books (https://www.blackburnbooks.com) and is the Editor of the woodworker's videoMagazine "WOODWORKING . . . in action!!!" (www.woodworkinginaction.com).

**Favorite Tool:** Every woodworker, including myself, whatever their particular enthusiasm, be it furniture, carving, turning, marquetry, or anything else, cares about how good their project looks. That's why the smooth plane is my favorite tool — since it's the one tool that produces— when properly used— the absolute BEST finish on any piece of wood.

**Best Project:** I once copied a fourteenth-century high-back chair that I fell in love with every time I visited the furniture collection in the Metropolitan Museum of Art in New York City. As I've often remarked, I know that there's not much market for thrones these days, but trying to follow in the footsteps of a furniture maker from so long ago taught me so much about this amazing craft that I have never ceased being in love with it.

**Working On:** I'm currently working on storage cabinets for my shop so that there will always be room for one more tool.

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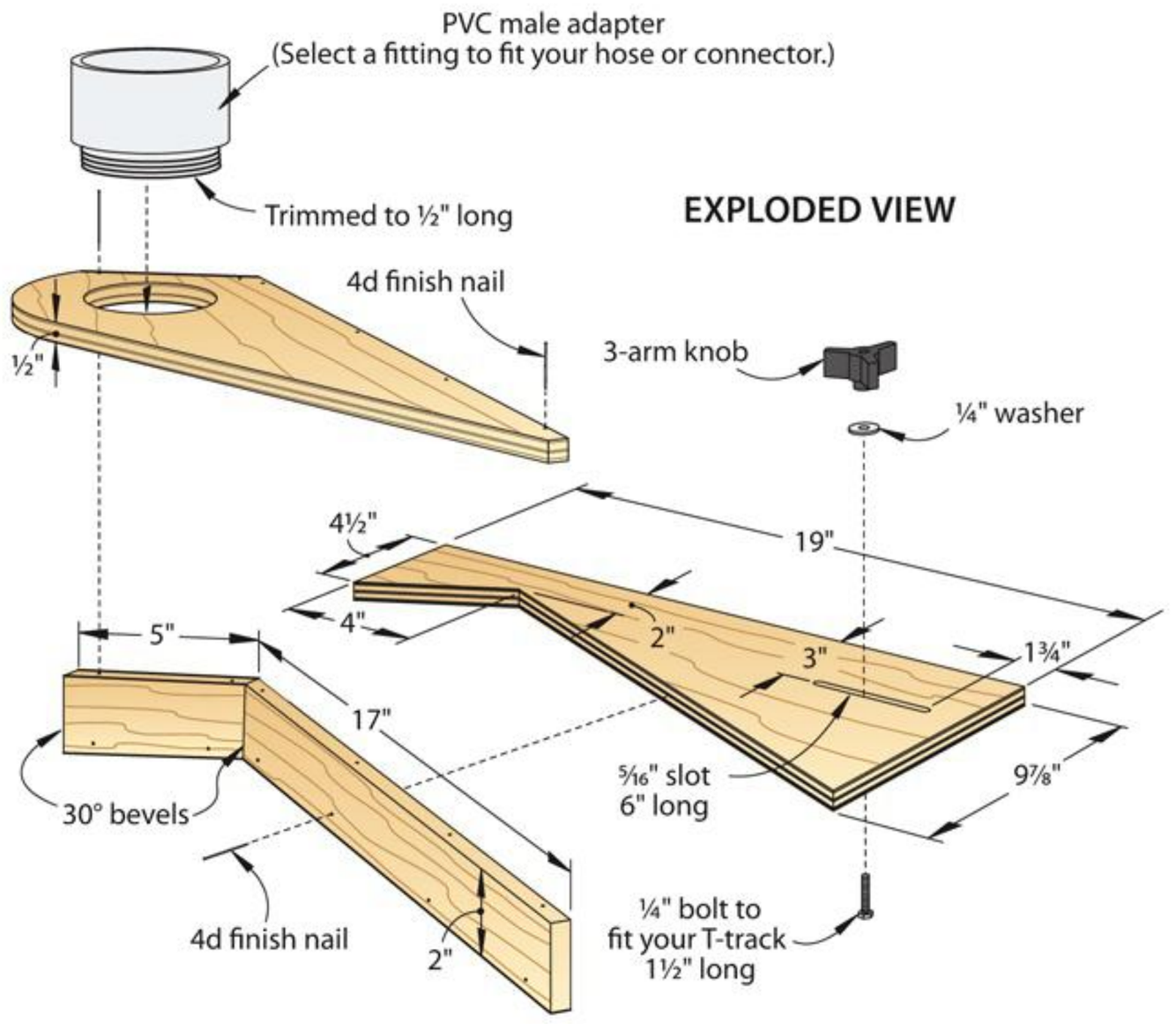
# Router-Table Dust Hood

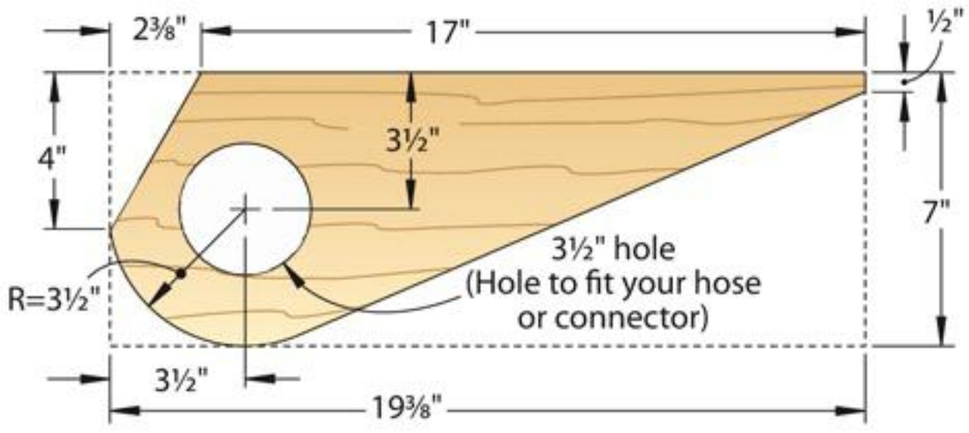
## Overhead cleanup when a straight fence just won't do

When you're template or freehand routing, a fence-mounted dust port does no good. So for those situations, Todd DiOrio of Sipesville, Pennsylvania, designed this dust hood. Todd says, "It can be mounted anywhere on the table, and is secured at a single point in T-track so it easily pivots to the best position."

To make your own, use ½" plywood and follow the illustrations. If you don't have T-track in your router table, simply drill a pivot hole or two in your router top to accept the pivot bolt. Also, select a connector (we used a PVC fitting) to fit your dust-collection hose. And cut an appropriate-sized hole in the hood top for a tight fit of the connector. If the connector doesn't fit tightly, epoxy it in place.




### HOOD TOP

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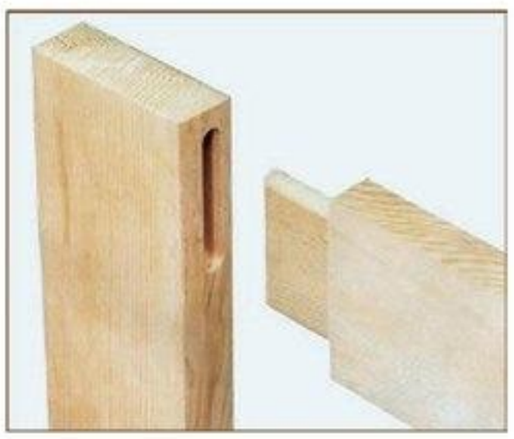
# Relieves Joint Pain

We feel your pain. Trying to make an accurate mortise and tenon joint without spending an arm and a leg on an expensive and elaborate jig setup can really give you a headache. But now General has developed the remedy. Our new E•Z Pro Mortise & Tenon Jig lets you cut a matching mortise and tenon with a single jig right out of the box! Just add a plunge router and stir. You'll be making 1/4", 3/8" or 1/2" mortises & tenons in no time and feeling much better. And, you don't need a prescription— our new jig is available over the counter for under $100. Ruggedly made from hardened, aircraft-grade aluminum, General's M&T Jig is designed for years of reliable service and provides long-lasting relief.



Works way better than aspirin!

***For more information on General's new Mortise & Tenon Jig and the rest of our E•Z Pro line of innovative wood joining jigs, visit www.generaltools.com/jointpain.***

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READER PROJECT

## Easy as child's play

# Toy Box/Blanket Chest

**Build this simple chest to store playthings. Then, after its owner grows up, put it to work holding blankets, linens, or clothes.**

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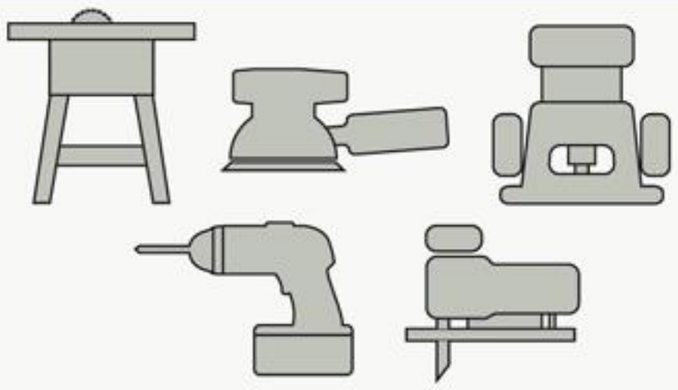
## WHAT YOU'LL NEED



- **Materials:** ¾" red oak, partial sheets of ¾" and ¼" plywood.

### PROJECT HIGHLIGHTS

- Overall dimensions: 31½" wide × 16" deep × 20" high.
- Sliding tray keeps smaller toys from being buried.
- Torsion hinges help prevent pinched fingers and other accidents.

Reader Bill Nolan, *right*, of Des Moines, Iowa, designed this rugged box with solid-wood parts so it would handle kids scooping toys from it for generations to come. And because he chose simple screw-together joinery, you'll have this toy collector built quicker than kids make messes. Below, Bill walks you through the process, sharing some of his best tips.

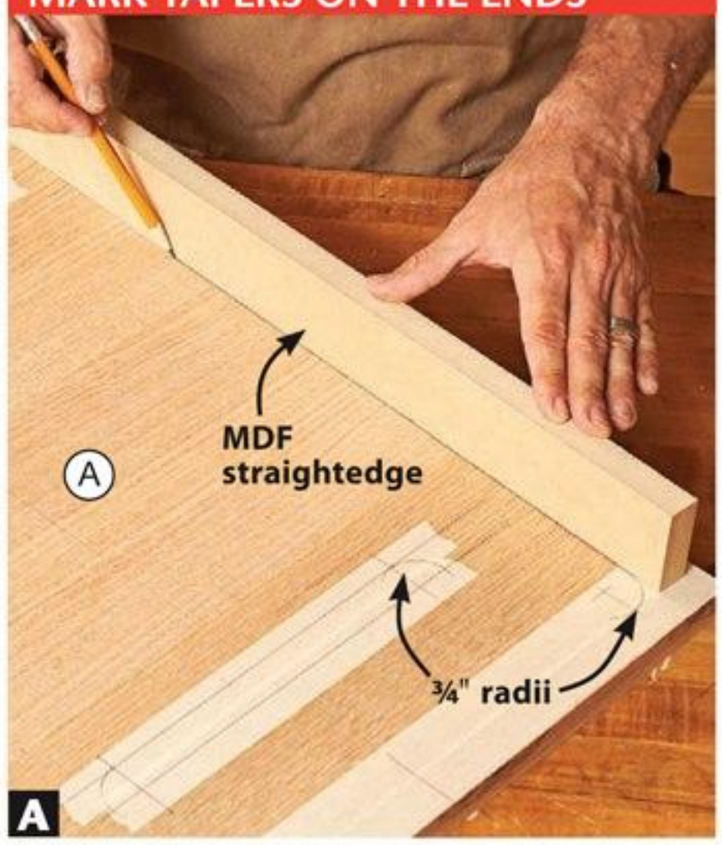
## It's 'How'd he do it?' time

**1** Edge-glue panels to make blanks for the ends (A), front and back (B), and lid (C) (**Materials List**, *page 39*). ***Quick Tip! I'll give it to you straight.*** For the best appearance, I look for straight-grained stock, even ripping narrow lengths of straight grain from wider boards. The joint lines blend together, and the glued-up panel looks like one wide board. After the glue dries, sand the panels smooth and cut the parts to size. Cut the cleats (D) to size, then set the front, back, lid, and cleats aside.

**2** On an end (A), draw the shapes of the handle slot, bottom, and tapers [**Drawing 1**, **Photo A**]. ***Quick Tip! Tape provides a clean layout.*** The open grain of oak pulls my pencil point away from a ruler. Masking tape provides a smooth layout surface—and reduces chip-out later when drilling and sawing.

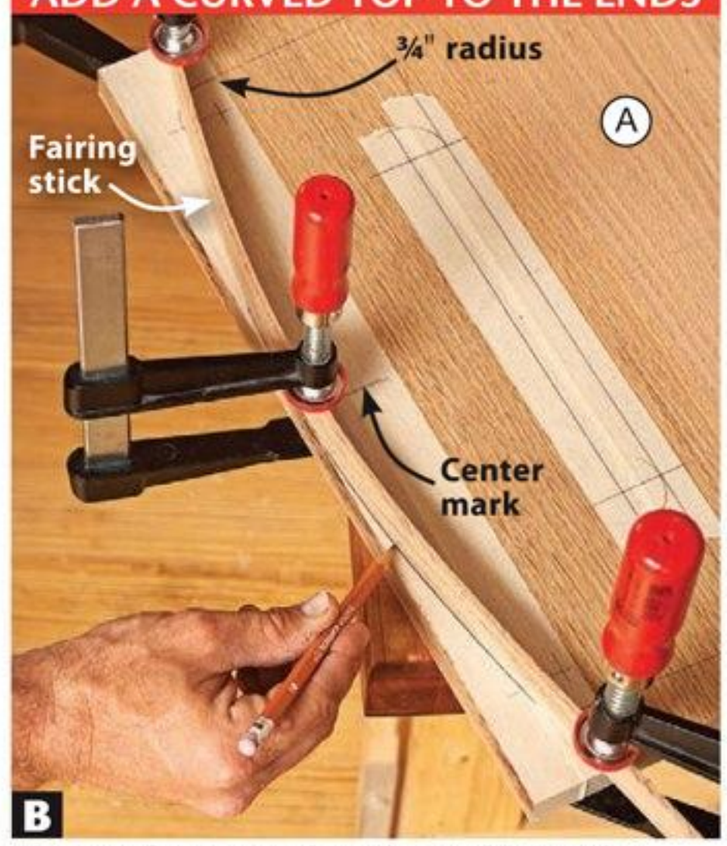
**3** Mark the center of the top arch on an end (A). To create a smooth curve, flex a thin scrap as a fairing stick, and draw the arch between the two ¾" radii [**Photo B**]. (See **More Resources** on *page39* for information about making and using a fairing stick.)

### MARK TAPERS ON THE ENDS



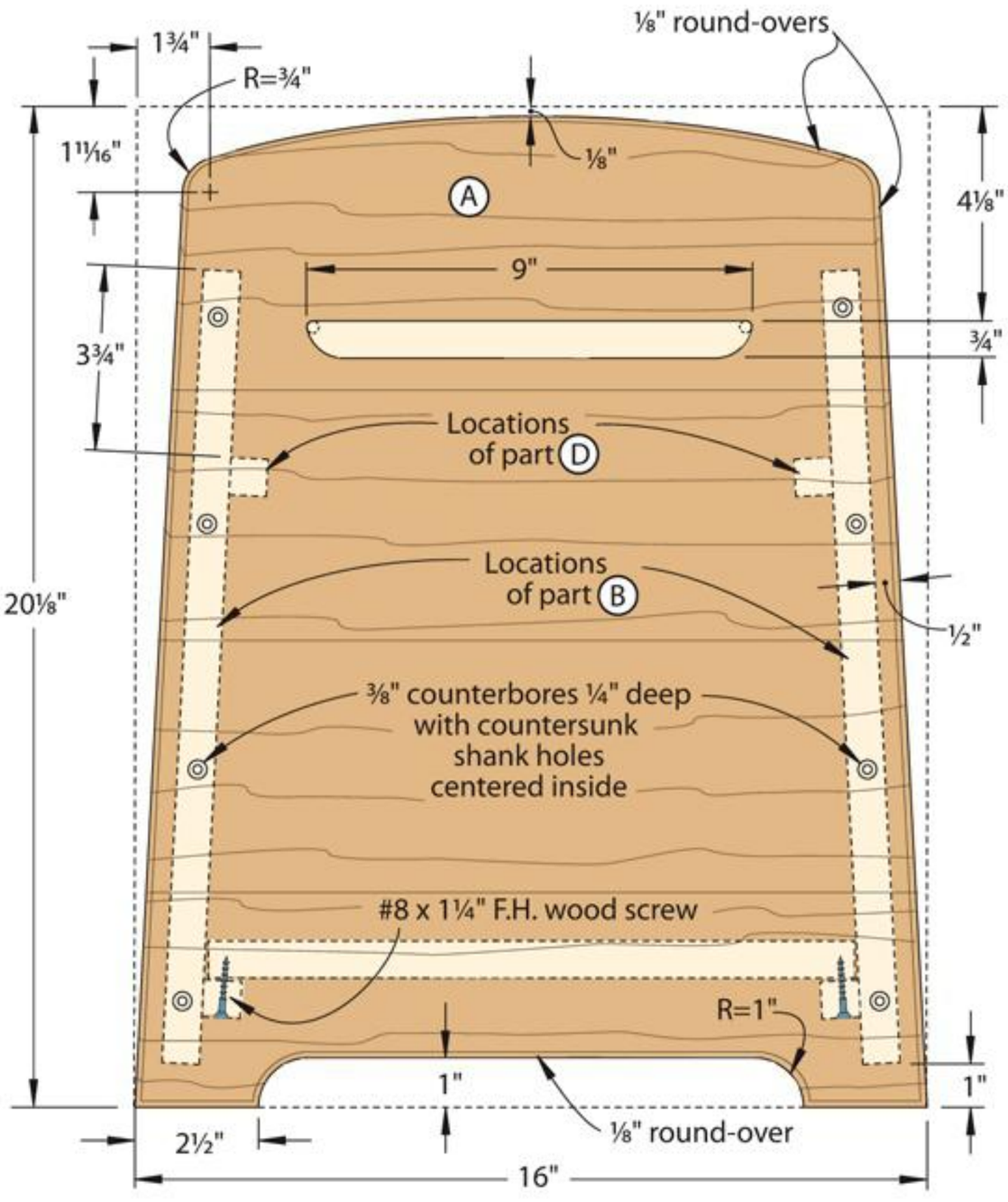

**A** Use a straightedge to connect the outside of the ¾"-radius mark near the top of a box end (A) to a corner at the bottom.

### ADD A CURVED TOP TO THE ENDS

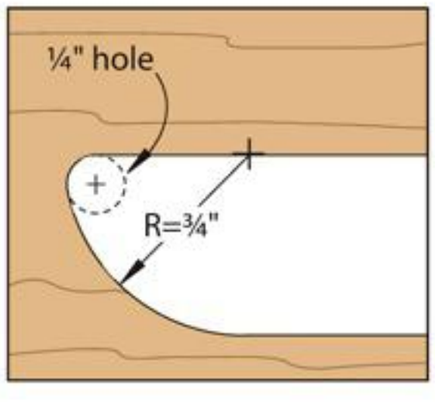



**B** Clamp a fairing stick to the end (A) at the center mark. Then bend the stick at the ends to meet the circles at the corners.

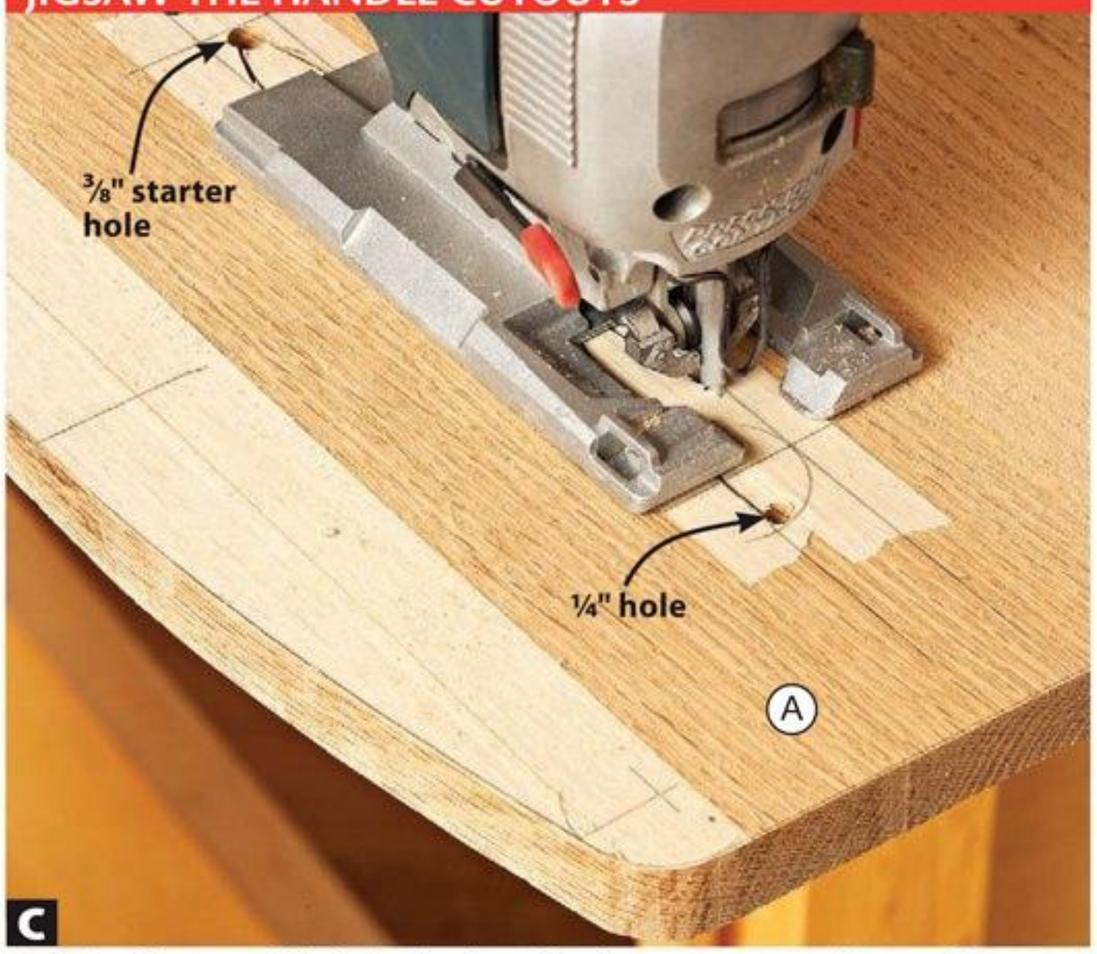
### 1 END VIEW




### 1a HANDLE-SLOT DETAIL

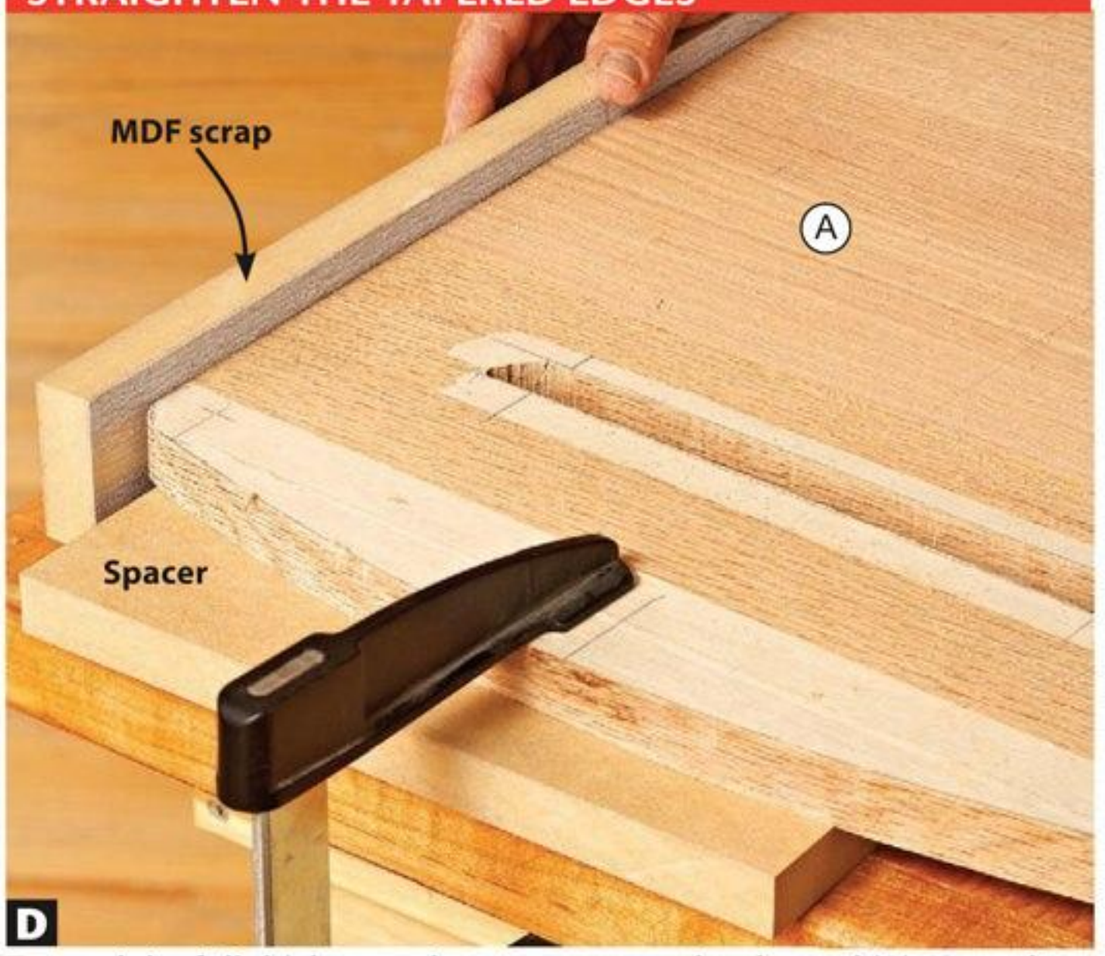


## JIGSAW THE HANDLE CUTOUTS




Starting from a ⅜" hole in the handle slot waste area, jigsaw the handle shape between the ¼" holes forming the corners.

## STRAIGHTEN THE TAPERED EDGES



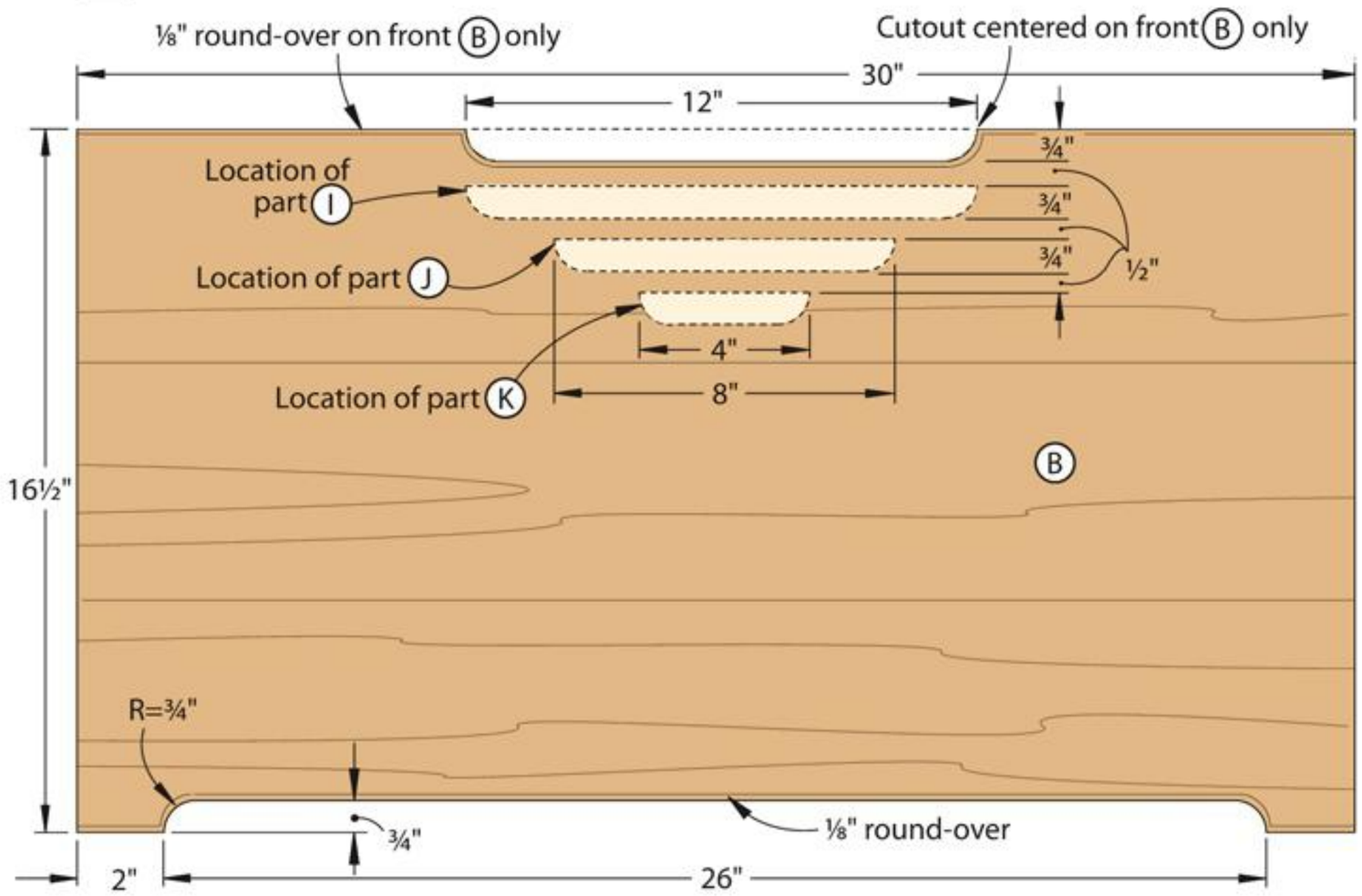

To sand the full thickness, clamp spacers under the end (A). Keep the edge square by running the sanding block on your bench.

**4** Define the corners of each handle slot by drilling ¼" holes [**Drawing 1a**]. (See the **Shop Tip** *below* to make a simple drilling jig.) Then drill a ⅜" starter hole [**Photo C**] and, using a jigsaw with a 20-tpi blade, cut out the handle slot. Wrap sandpaper around ⅜" and ¾" dowels to smooth the handle opening up to 220 grit. Then adhere sandpaper to an MDF scrap and sand the tapers smooth [**Photo D**]. Repeat for the other end.

**5** Retrieve the front and back (B) and apply masking tape to their bottom edges and the top edge of the front. Mark the cutouts [**Drawing 2**], jigsaw just outside the lines, and sand to the lines. Then rout ⅛" round-overs on the front, back, and ends (A) where shown [**Drawings 2** and **3**].

**6** Glue and clamp the bottom cleats (D) in position on the front and back (B) [**Drawing 3**]. Sand the front, back, and ends (A) to 220 grit.

**2 FRONT VIEW**



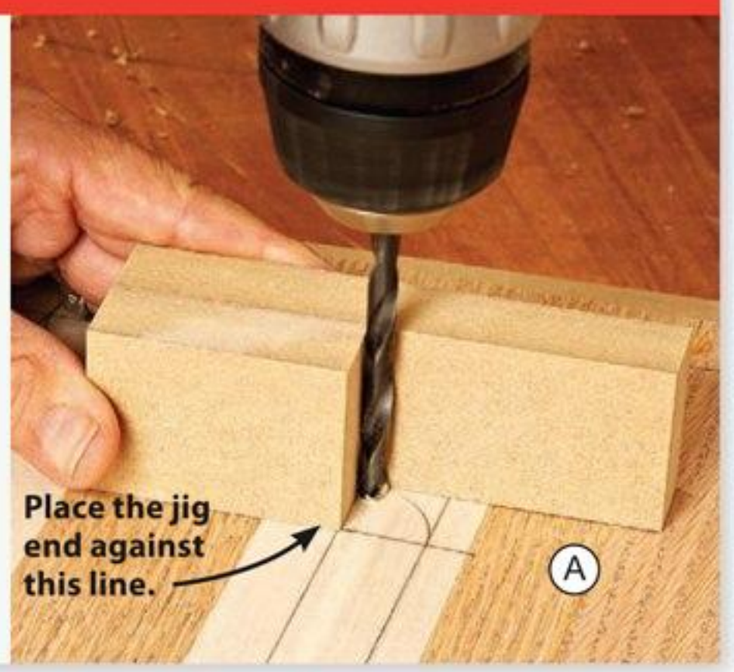

## Now build the box

**1** Lay out the counterbore locations on each end (A) [**Drawing 3**] but don't drill them yet. Rest the front and back (B) on 1" spacers and clamp them to one end. ***Quick Tip! Use spacers as a third hand.*** To create a perfect ½" inset for the front and back, I cut two 1×18" strips from ½"-thick MDF and double-faced-tape them to the ends (A) flush with the edges [**Photo E**]. Drill counterbored pilot holes and countersinks in the end and screw it to the front and back. (If your panels warp slightly, see the **Shop Tip** on *page 38* for a solution.)

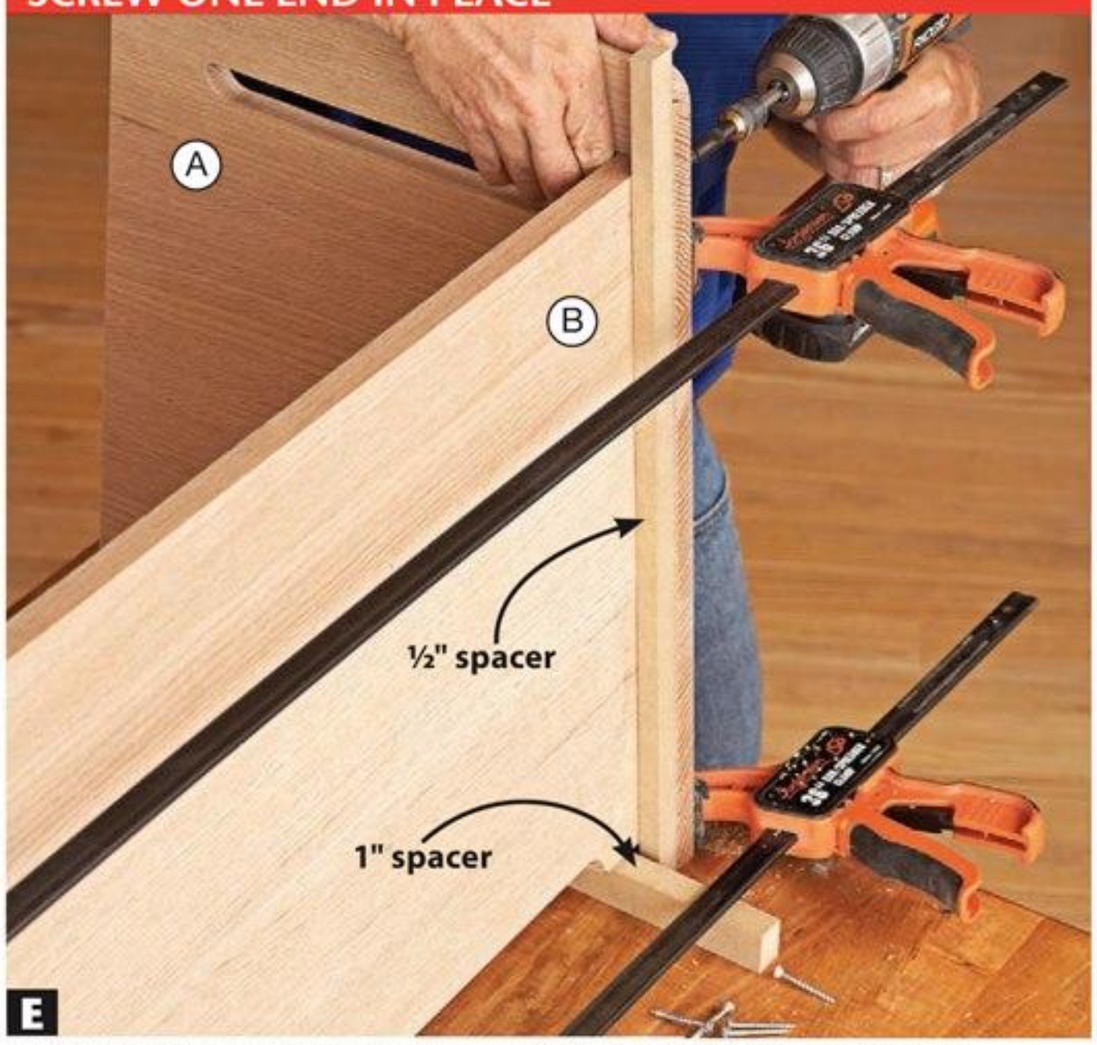
## SHOP TIP

### Drill perpendicular holes without a drill press

Instead of wrestling with large panels on a small drill-press table, I use this simple bit alignment jig, made from ¾" MDF scrap, when drilling the rounded handle corners in the sides (A). To make the jig, cut two 1½"-wide pieces with squared ends: one 2½" long and one 5" long. Glue them together with one end flush. To drill a perfectly perpendicular hole, align the jig with two adjacent layout lines, nestle the bit in the corner of the jig, and drill the hole.



## SCREW ONE END IN PLACE




A ½"-wide spacer taped to the end (A) along the tapered edge provides a registration surface for mounting the front and back (B).

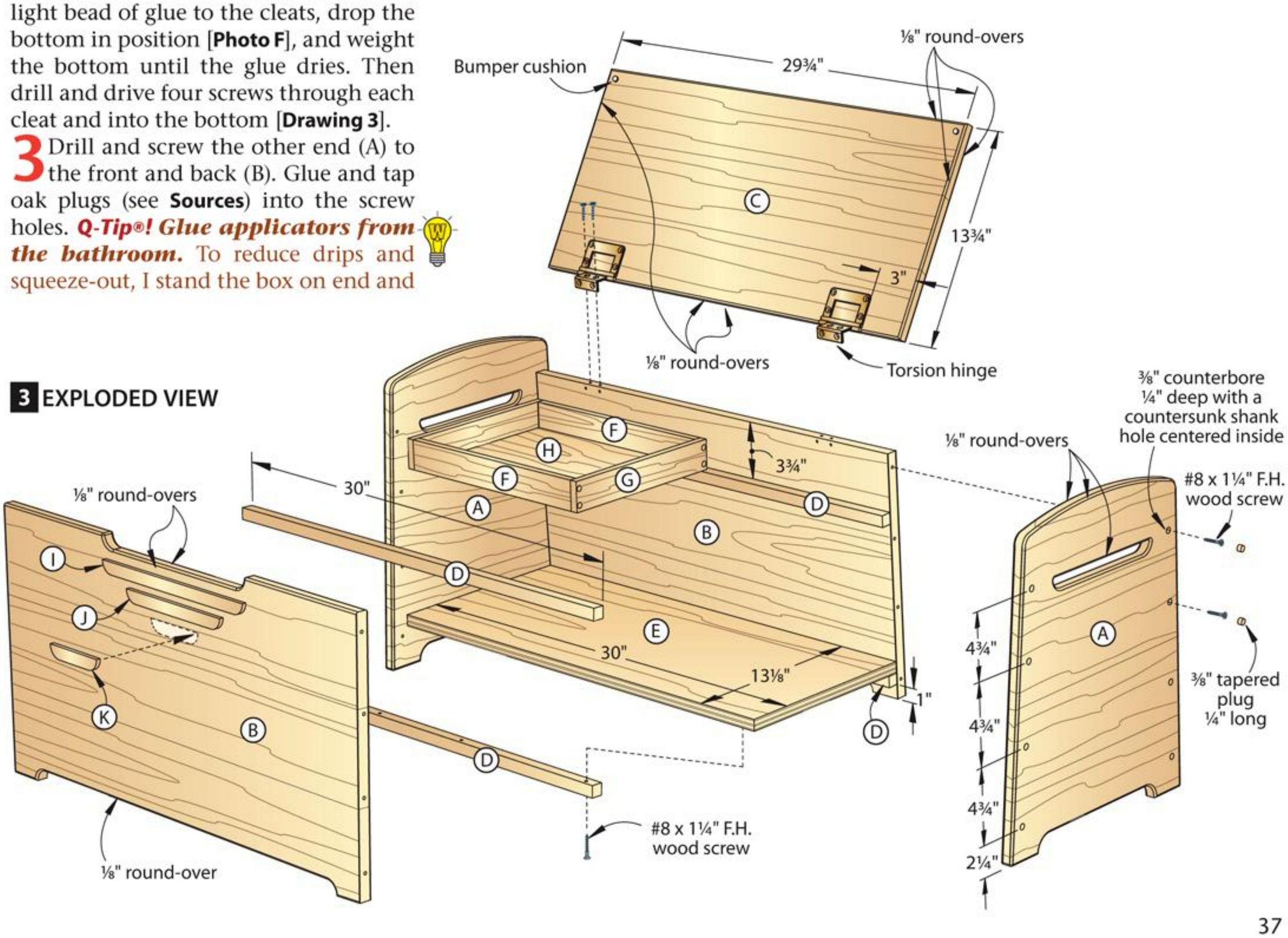
## INSTALL THE BOTTOM

Gently spread the front and back (B) apart to slide the bottom (E) above the cleats (D) without smearing the glue beads.

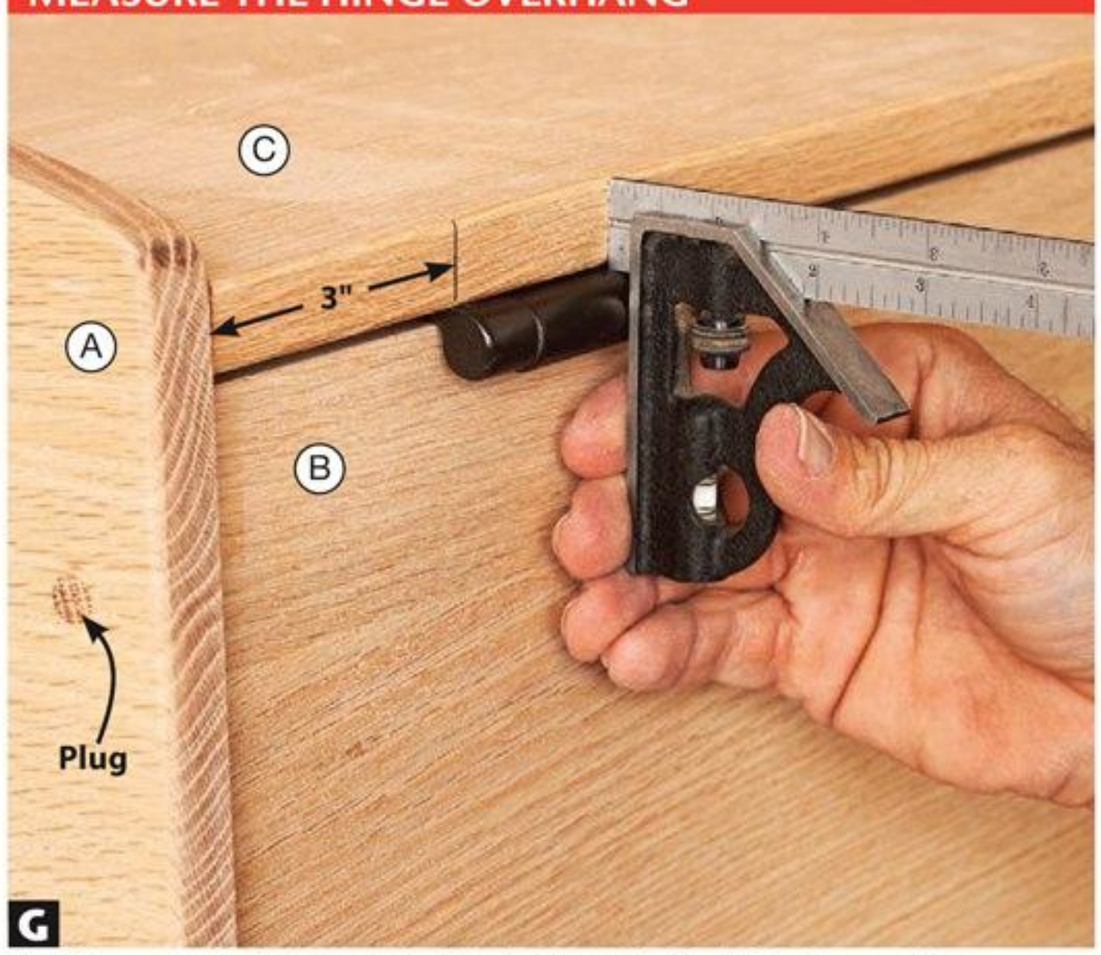
**2** Cut the bottom (E) to size and test-fit it on the bottom cleats (D) between the front and back (B). (The angled front and back will prevent the bottom from resting flat on the cleat edges.) Apply a light bead of glue to the cleats, drop the bottom in position [**Photo F**], and weight the bottom until the glue dries. Then drill and drive four screws through each cleat and into the bottom [**Drawing 3**].

**3** Drill and screw the other end (A) to the front and back (B). Glue and tap oak plugs (see **Sources**) into the screw holes. ***Q-Tip®! Glue applicators from the bathroom.*** To reduce drips and squeeze-out, I stand the box on end and dab glue in the counterbores with a cotton swab. After the glue dries, trim the plugs near flush with a handsaw or chisel and sand them smooth.

**4** Cut the lid (C) to size from the panel you glued up earlier, allowing 1/16" gaps between the lid ends and the box ends (A), and ¼" overhangs at the front

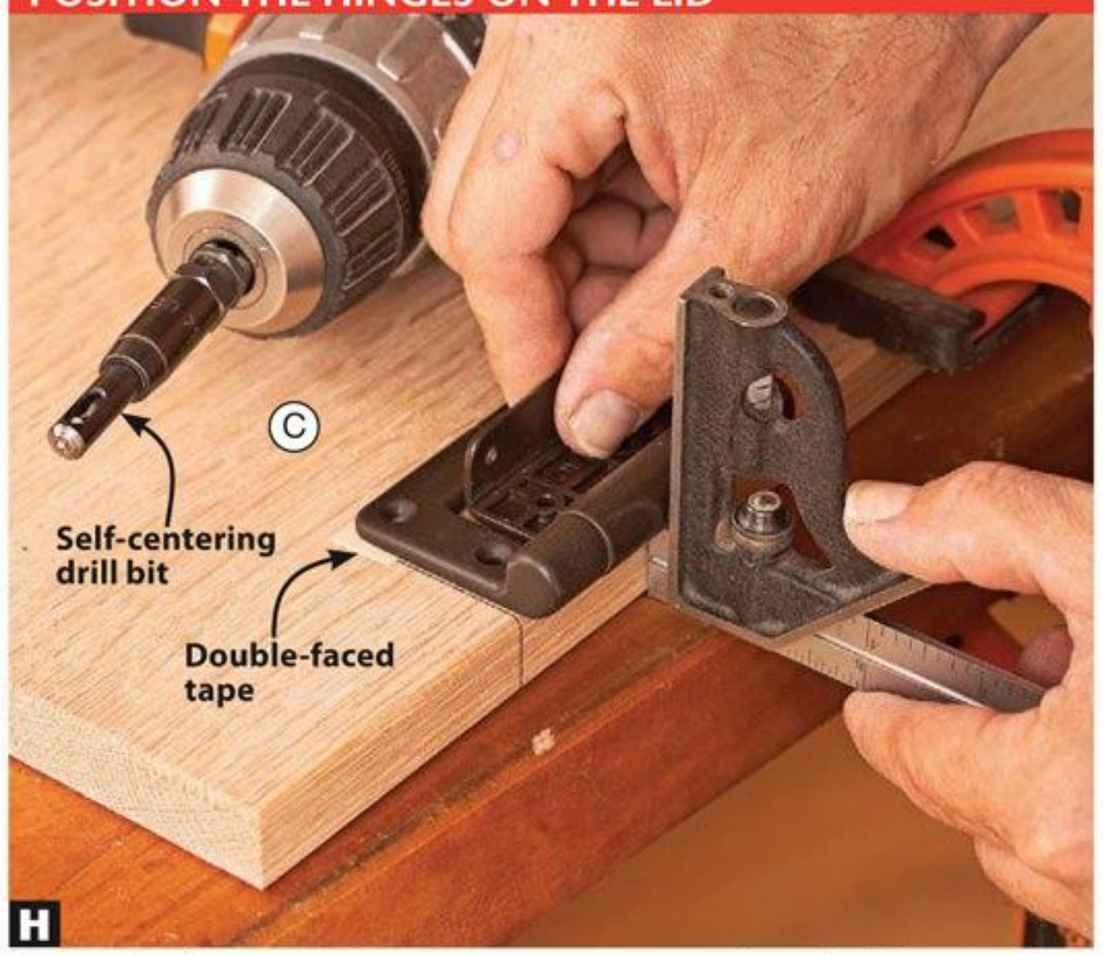


## MEASURE THE HINGE OVERHANG




The hinge self-aligns on the back (B). With the lid (C) in position, measure how far the hinge barrel extends beyond the lid edge.

## POSITION THE HINGES ON THE LID




Using your hinge overhang measurement, position the hinge on the underside of the lid (C) and hold it there with double-faced tape.

and back (B). Ease the lid edges with a ⅛" round-over bit [**Drawing 3**] and sand the lid to 220 grit.

**5** Mark the hinge locations along the rear edge of the lid (C). ***Note:*** *We used torsion hinges [**Sources,** and Shop-Proven Products on* page 80] *that prevent the lid from falling and possibly causing injury.* Center the lid on the box (A/B/D/E) and measure the hinge overhang [**Photo G**]. Remove the lid and position the hinges on its underside using the overhang you just measured [**Photo H**]. Double-faced-tape them in place. Drill and screw the hinges to the lid. ***Quick Tip! The perfect bit for hinges.*** Since I discovered self-centering drill bits [**Sources**], my screw holes end up perfectly centered in the hinge-leaf holes so the hinge mounts exactly where I intended.

**6** Center the lid (C) between the ends (A), and drill and screw the hinges to the top edge of the back (B).

## Add a tray, trim, and finishing touches

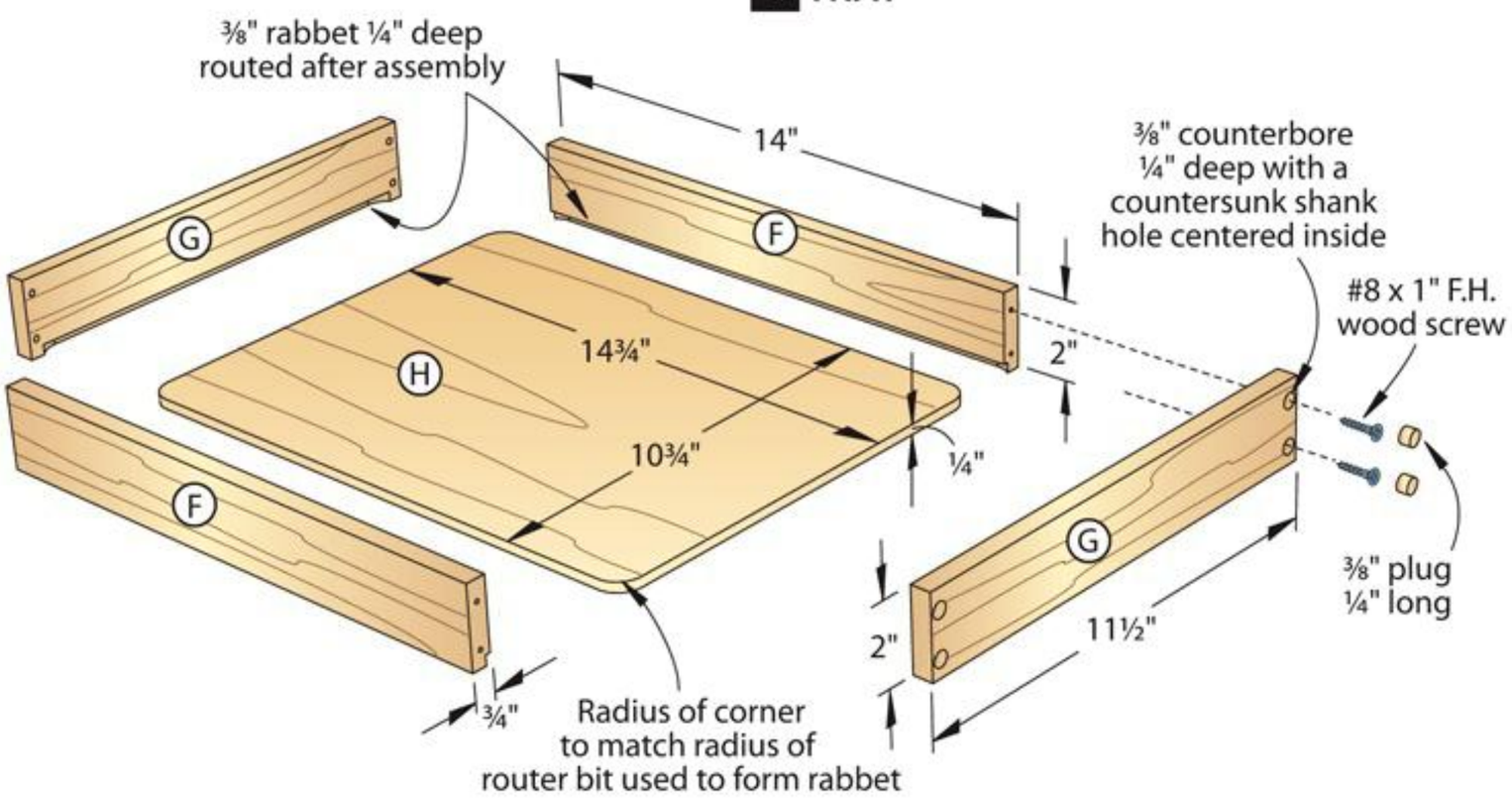
**1** Retrieve the other two cleats (D) and glue and clamp them to the front and back (B) [**Drawing 3**].

**2** Cut the tray front and back (F) and ends (G). Glue and screw the ends to the front and back [**Drawing 4**].

**3** Insert a ⅜" rabbeting bit in your router and attach a ¼×6×20" auxiliary subbase with a centered hole ¼" larger than your rabbeting bit diameter. (I mount this subbase with double-faced tape.) Set the bit to cut ¼" deep and rabbet the inside edges of the tray front and back (F), and ends (G) [**Photo I**].

**4** Measure between the rabbets and cut the tray bottom (H) to fit. Using a file and sandpaper, round the tray-bottom corners to fit the curved corner rabbets. Then glue and clamp the bottom in place. Sand the tray to 220 grit and ease the edges.

### 4 TRAY

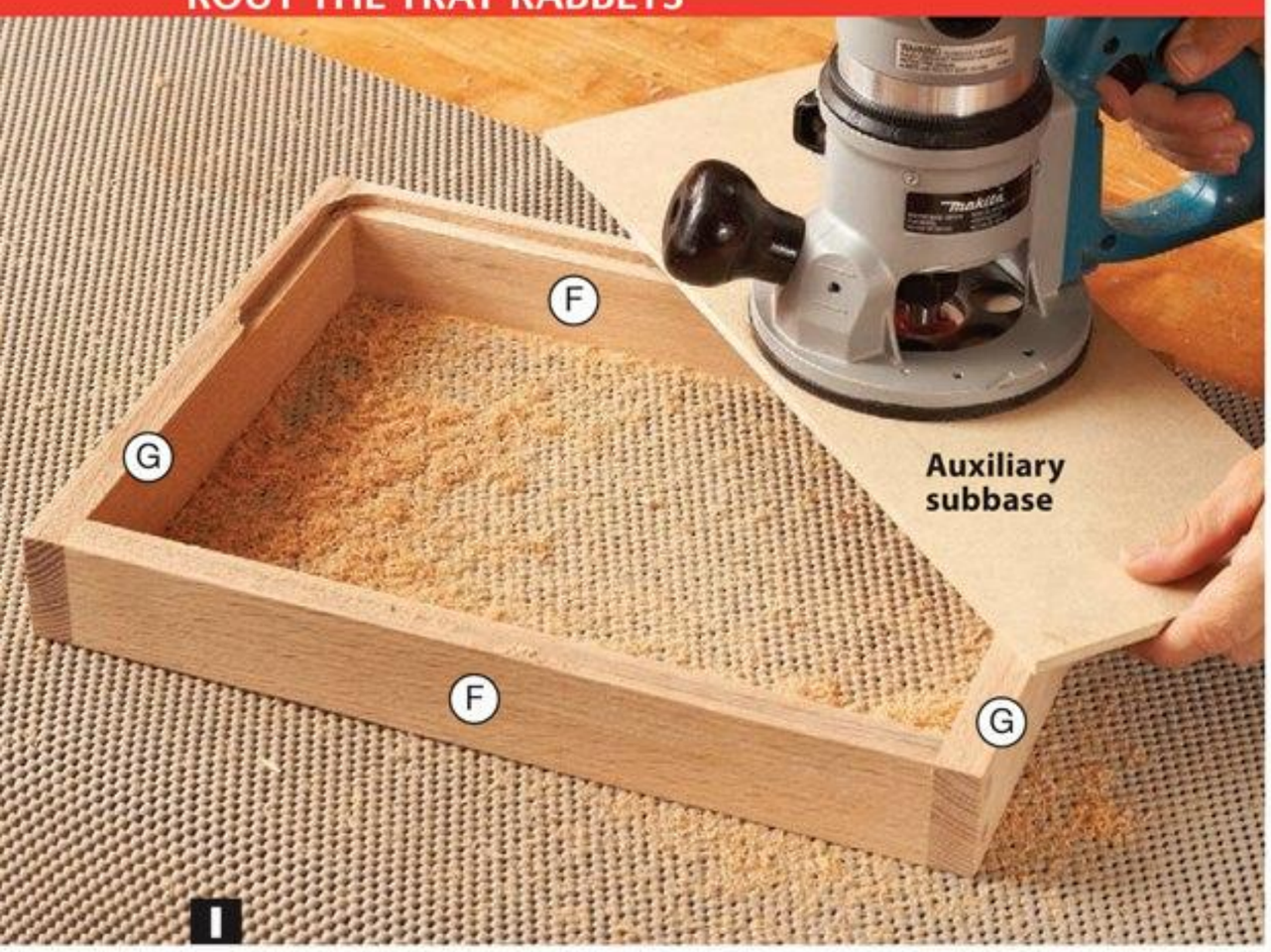



## SHOP TIP

### Flatten panels as you assemble them

Even the most carefully edge-glued panel can warp slightly, but you can pull it back into shape during assembly. In the example shown *below*, the front (B) warps inward near the top. To straighten it, first screw the panel in place at the bottom while leaving a gap at the top between the panel and the spacer. Then pull the panel snug against the spacer and drive the second screw. Repeat for the remaining screws until the panel fits tightly against the spacer at the top.

## ROUT THE TRAY RABBETS




**An auxiliary subbase cut from ¼"-thick MDF straddles the tray front and back (F) and ends (G), preventing the router from tipping.**

## MASK OFF TRIM LOCATIONS

**Preserve unstained areas for gluing on the front trim (I, J, K) by covering them with masking tape just smaller than the trim.**

**5** From ¾" stock, rip two strips ¼" wide and 13" long. Lay out the shapes of the top (I), center (J), and bottom (K) trim [**Drawing 2**]. Cut and sand them to shape and sand the faces to 220 grit.

**6** Apply masking tape over the area where you'll mount the trim (I, J, K) on the front (B) [**Drawing 2**]. Lay out the shapes of the trim on the tape by tracing around the parts. Using a crafts knife, cut about ⅛" inside the part lines and remove the surrounding tape.

**7** Remove the hinges and finish-sand the parts to 220 grit. Stain the toy box and apply a contrasting stain to the front and edges of the front trim (I, J, K). (I used Varathane stains: no. 211756 Summer Oak for the box and no. 211804 American Walnut for the trim.) Remove the tape after the stain dries to reveal a sound glue surface [**Photo J**].

**8** Glue and clamp the front trim (I, J, K) to the box front (B). After the glue dries, apply a top coat. (I wiped on three coats of a satin polyurethane.) Apply bumper cushions at the front corners of the lid [**Drawing 3**].

We want to feature YOUR project design next. Send photos and/or drawings to woodmail@woodmagazine.com or via USPS to *WOOD*® magazine, 1716 Locust St., LS-221, Des Moines, IA 50309.

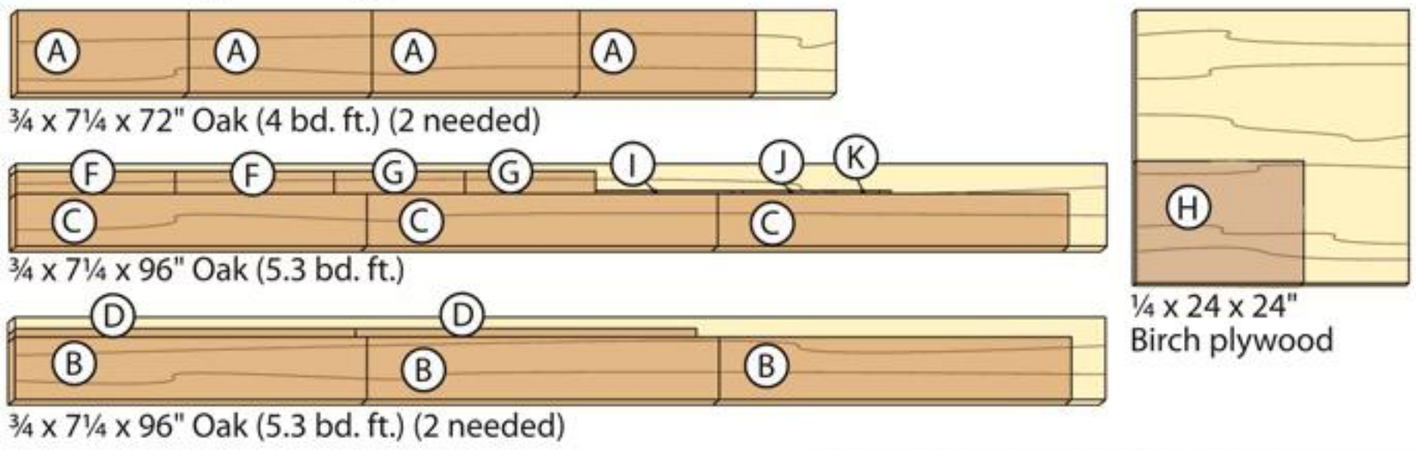
## Materials List

| Part | | FINISHED SIZE T | W | L | Matl. | Qty. |
|---|---|---|---|---|---|---|
| **Box** | | | | | | |
| A* | ends | ¾" | 20" | 16" | EO | 2 |
| B* | front/back | ¾" | 16½" | 30" | EO | 2 |
| C* | lid | ¾" | 13¾" | 29¾" | EO | 1 |
| D | cleats | ¾" | ¾" | 30" | O | 4 |
| E | bottom | ¾" | 13⅛" | 30" | BP | 1 |
| **Tray** | | | | | | |
| F | tray front/back | ¾" | 2" | 14" | O | 2 |
| G | tray ends | ¾" | 2" | 11½" | O | 2 |
| H | tray bottom | ¼" | 10¾" | 14¾" | BP | 1 |
| **Trim** | | | | | | |
| I* | top trim | ¾" | ¼" | 12" | O | 1 |
| J* | center trim | ¾" | ¼" | 8" | O | 1 |
| K* | bottom trim | ¾" | ¼" | 4" | O | 1 |

*Parts initially cut oversize. See the instructions.

**Materials key:** EO-edge-glued oak, O–oak, BP–birch plywood.
**Supplies:** Double-faced tape, masking tape, #8×1¼" flathead wood screws (24), #8×1" flathead wood screws (8).
**Blade and bits:** ⅛" round-over, ⅜" rabbeting router bits; 20-tpi jigsaw blade; ⅜", ¼" drill bits.

## Cutting Diagram


A A A A
¾ x 7¼ x 72" Oak (4 bd. ft.) (2 needed)
F F G G I J K
C C C
¾ x 7¼ x 96" Oak (5.3 bd. ft.)
D D
B B B
¾ x 7¼ x 96" Oak (5.3 bd. ft.) (2 needed)
H
¼ x 24 x 24"
Birch plywood
E
¾ x 24 x 48" Birch plywood

## MORE RESOURCES

**FREE VIDEO**
- "Clamp and Sand Panels Flat" woodmagazine.com/panels

**FREE ARTICLE**
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## Sources

**Hinges:** 30-inch/lb Lid-Stay torsion hinges in rustic bronze (2) no. 37327 [pack of 2], $37.99, Rockler Woodworking, 800-279-4441, rockler.com.
**Plugs:** ⅜" tapered oak plugs (8) no. 23515 [pack of 50], $5.99, Rockler.
**Self-centering drill bits:** 3-pc. set of #4, #6, #8 bits no. 69053, $27.99, Rockler.
**Bumper cushions:** ½x⅛" no. 37931 [pack of 25], $3.89, Rockler.

Produced by **Craig Ruegsegger** with **Jeff Mertz**
Project design: **Jeff Mertz** and **Bill Nolan**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

# Glass-top Display Table

**This handsome home for treasured items features a lift-off top for easy access.**

Keep your favorite mementos where you can see and enjoy them, free from dust and fingerprints. Glass sides give a view from all angles, and a clear acrylic top panel won't break. (Or you can choose tempered glass for the top.) Joinery couldn't be simpler: Four identical rabbeted frames are glued to the legs, and biscuits reinforce the mitered top frame.

## Fashion four frames first

**1** From ½" stock, cut the frame tops/bottoms (A) and the frame sides (B) to size [**Drawing 1**]. Attach auxiliary fences to your tablesaw rip fence and to your miter gauge. Set up a ½" dado blade ¼" above the table and rabbet each end of the tops and bottoms. Switch back to a rip or combination blade and cut a ¼"-deep groove for the glass panel in the tops, bottoms, and sides. Finish-sand the pieces to 220 grit.

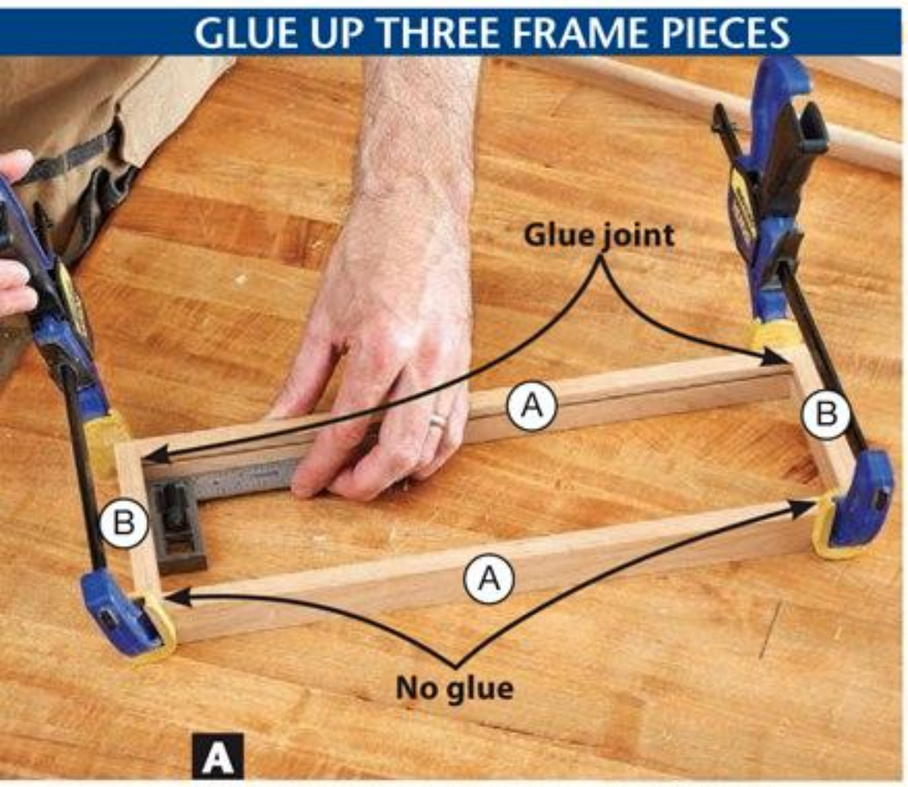
**2** Apply glue only to the rabbets in the frame *bottoms* (A). Clamp the sides (B) and top (A) in place [**Photo A**], making sure the grooves in all pieces align. ***Note:*** *Do not glue the top.* After the glue dries, drill and countersink 3/32" pilot holes [**Drawing 1**] through the top and into the sides.

**3** To make the beads (C), rout ¼" round-overs on all four edges of two ½×2×31" blanks. Rip a ⅝"-wide strip from each edge, then crosscut the beads to match the length of the frames (A/B). Sand the beads to 220 grit, then glue them to the bottom of the frames (A/B) [**Drawing 1a**, **Photo B**].

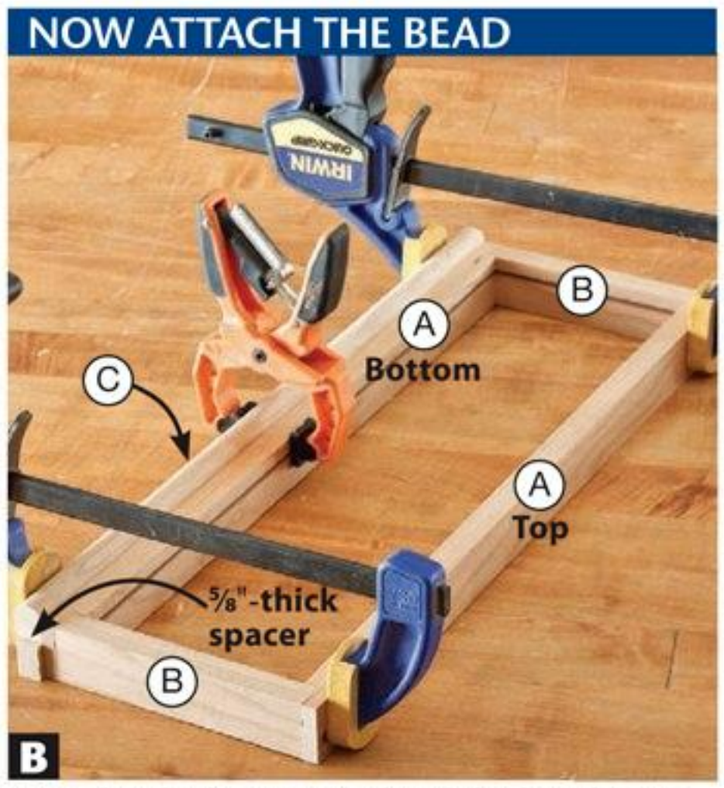
**4** Cut the aprons (D) to size [**Drawing 1**]. Using a fairing stick [**More Resources**], lay out the curve on the bottom edge of each one; then bandsaw and sand them smooth. ***Quick Tip! Sand identical curves.*** Stack the aprons together with double-faced tape and sand all four at once using a sanding drum. Sand the faces of the aprons to 220 grit. Lay each frame (A/B/C) flat on your bench and glue an apron to each one [**Photo C**], making sure the ends are flush. After the glue dries, screw the tops (A) to the sides (B).

## Make the legs and assemble the base

**1** Cut the legs (E) to size [**Drawing 2**]. Make a copy of the **Leg Pattern** [**Drawing 3**] and spray-adhere it to a ¼×1⅜×5" piece of hardboard or plywood. Bandsaw and sand the template to shape, then use it to lay out the curve on the two inside faces of each leg. Bandsaw and sand the curves to shape, then sand the legs to 220 grit.

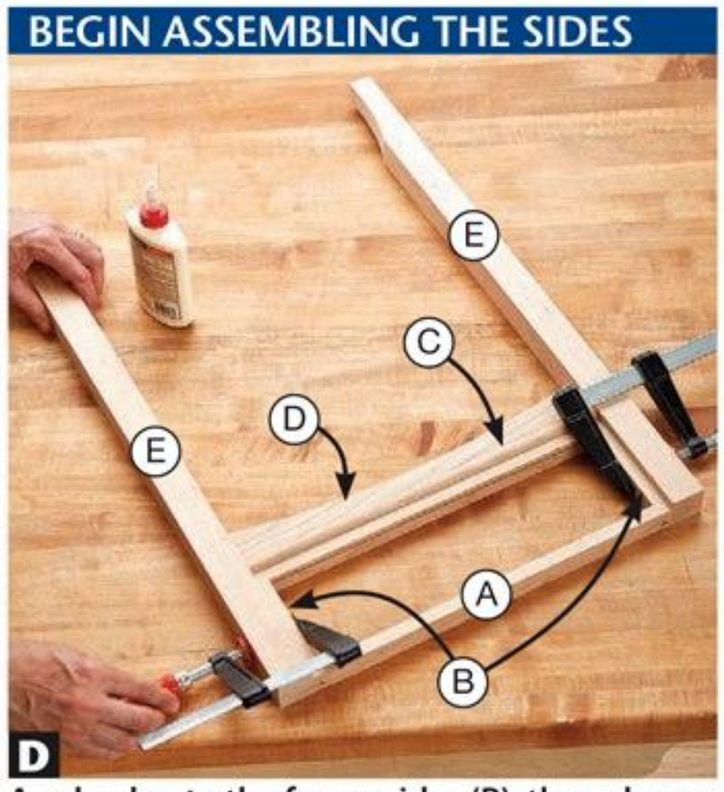



Glue only the sides (B) and bottom (A) together. The top (A) is screwed in place later. Use it as a spacer during the glue-up.

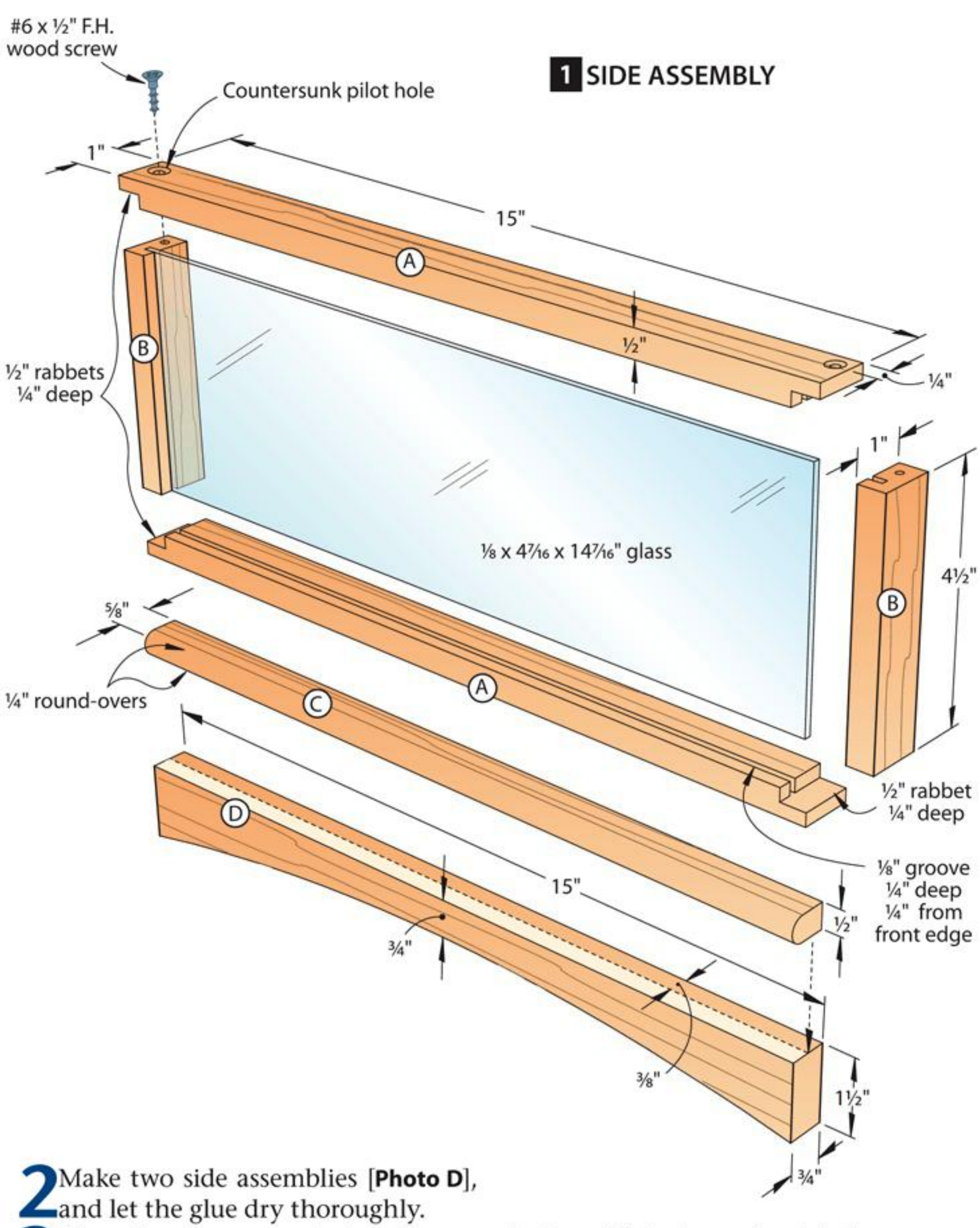


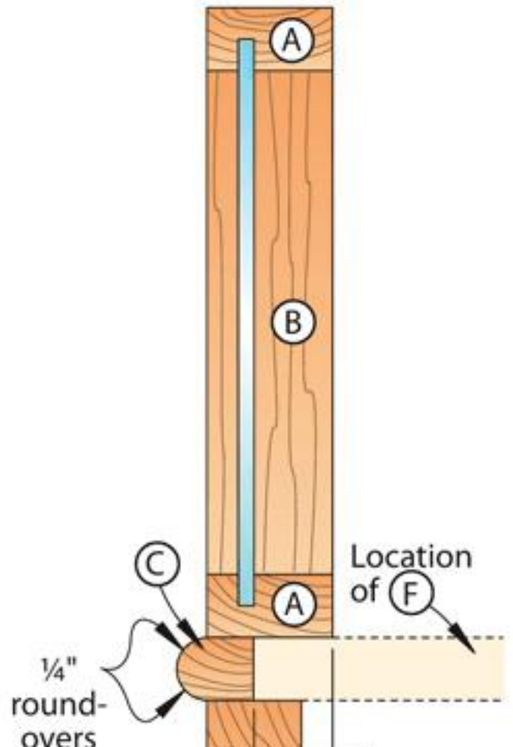

Use a ⅝"-thick spacer behind the bead (C) to position it while gluing it to the frame (A/B). Remove the spacer after a few minutes.

A ¼" spacer below the apron (D) positions it. The apron, bead (C), and bottom (A) create a groove that the bottom (F) fits into later.




Apply glue to the frame sides (B), then clamp a frame (A–D) between two legs (E) with their tops and inside faces flush.

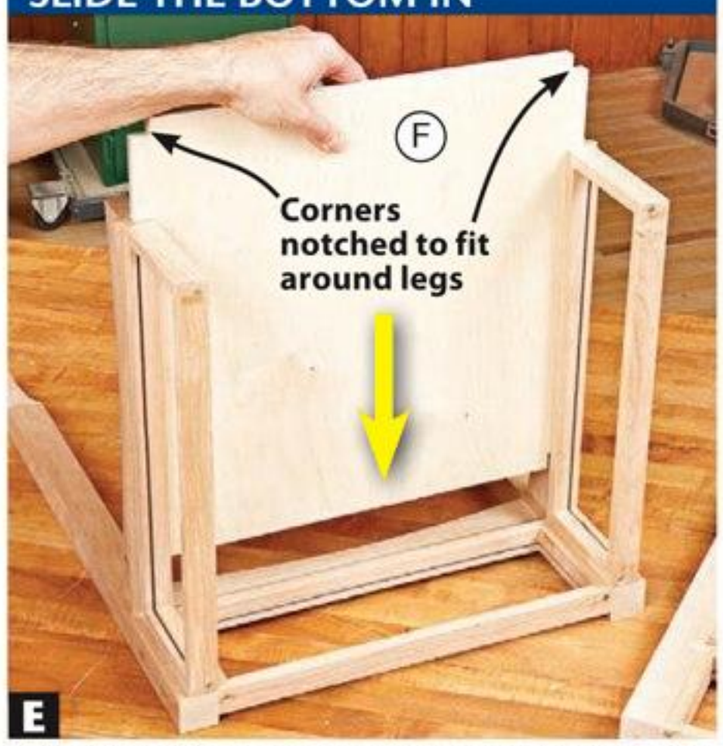



**2** Make two side assemblies [**Photo D**], and let the glue dry thoroughly.

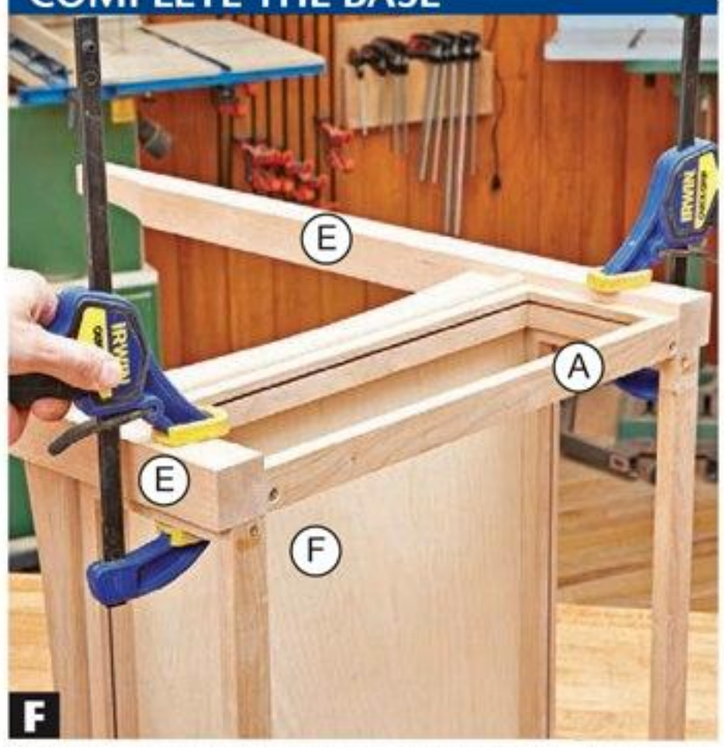
**3** Glue the two remaining frames (A–D) to one of the side assemblies (A–E), again with the tops and inside edges flush. While the glue dries, cut the bottom (F) to size and notch the corners to fit around the legs [**Drawing 2, Photo E**]. Test the fit, then glue the bottom in the grooves.

## SLIDE THE BOTTOM IN




With three frames (A–D) glued to two legs (E), check the fit of the bottom (F) in the grooves behind the beads (C).

## COMPLETE THE BASE

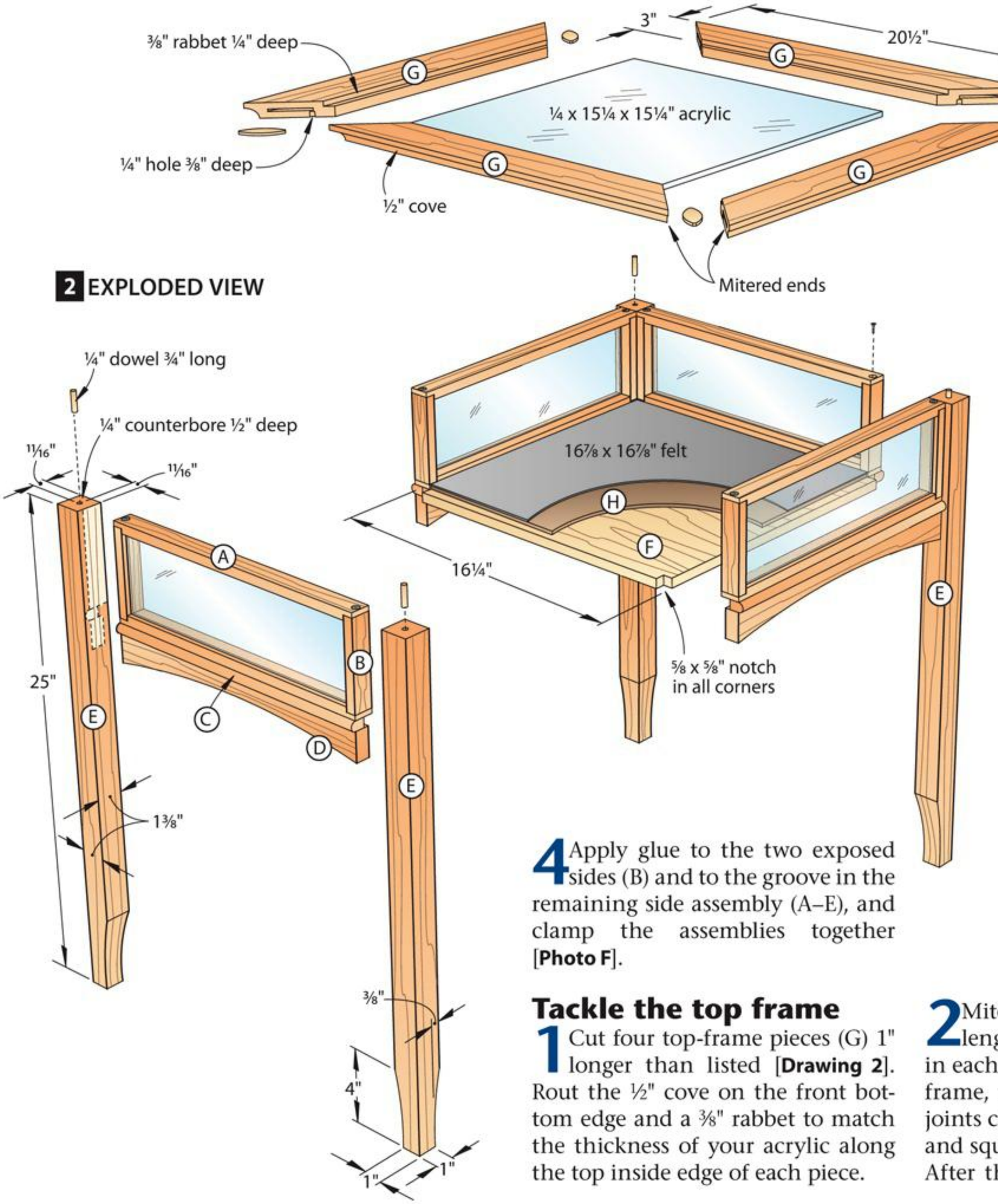



After clamping the side assembly (A–E) to the sides (B), stand the base up on a flat surface to ensure all four legs rest flat.

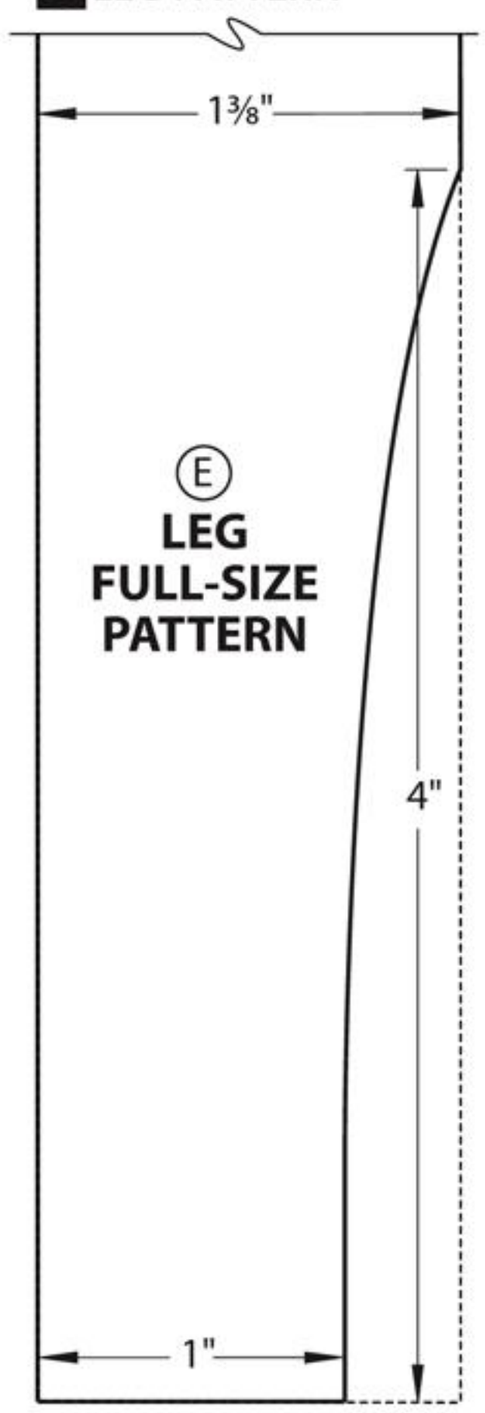
## PINPOINT THE DOWEL HOLES

Protect the frame (G) with a scrap, then tap each corner directly above the leg so the brads leave a dimple on the underside.

### 2 EXPLODED VIEW




### 3 LEG PATTERN




**4** Apply glue to the two exposed sides (B) and to the groove in the remaining side assembly (A–E), and clamp the assemblies together [**Photo F**].

## Tackle the top frame

**1** Cut four top-frame pieces (G) 1" longer than listed [**Drawing 2**]. Rout the ½" cove on the front bottom edge and a ⅜" rabbet to match the thickness of your acrylic along the top inside edge of each piece.

**2** Miter-cut the top-frame pieces (G) to length, then cut slots for #20 biscuits in each end [**Drawing 2**]. Glue up the top frame, using a band clamp to draw the joints closed. Make sure the frame is flat and square before setting it aside to dry. After the glue dries, sand the frame to

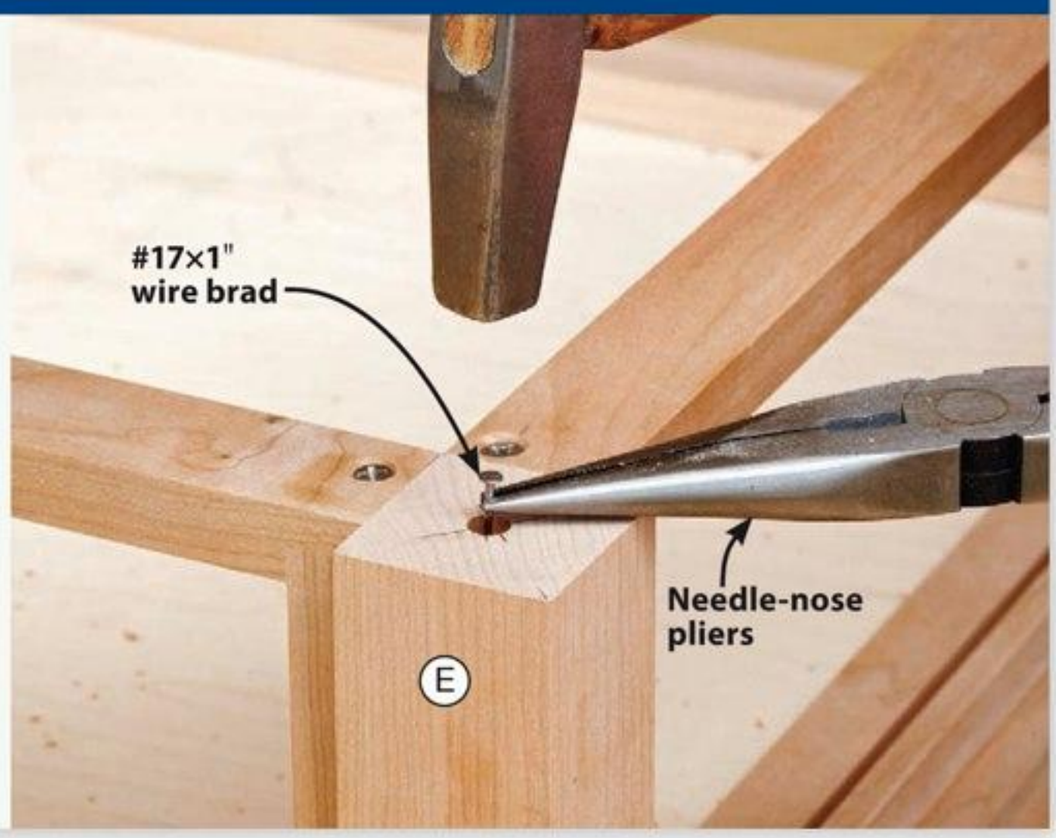
## TRIM THE FELT

Trim at a 45° angle ¼" from each corner. Apply spray adhesive to the back of the liner core (H), and fold the felt over, pulling it taut.

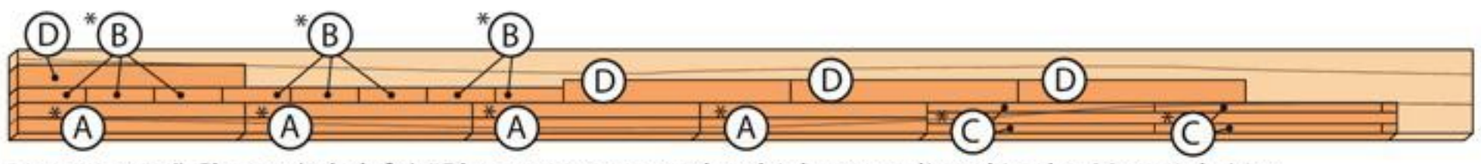
## SHOP TIP

### Finger saver

Do large fingers prevent you from gripping and striking small brads? Hold those short fasteners with a pair of needle-nose pliers instead. Rest the pliers on top of the leg (E) to steady them as you drive the brads. Then use the pliers' wire cutters to snip the heads off the brads.

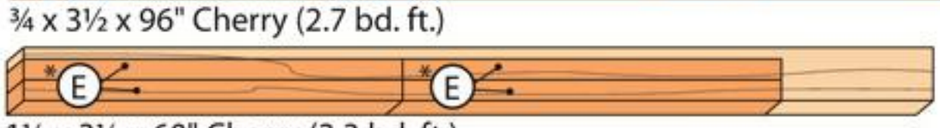



## Cutting Diagram

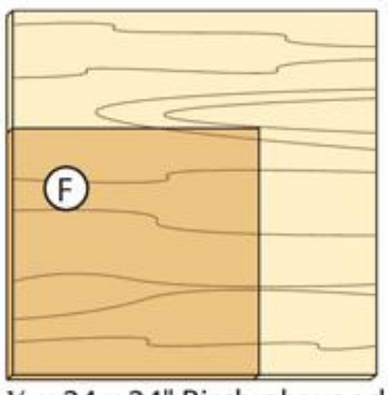



¾ x 5½ x 96" Cherry (4 bd. ft.) *Plane or resaw to the thicknesses listed in the Materials List.

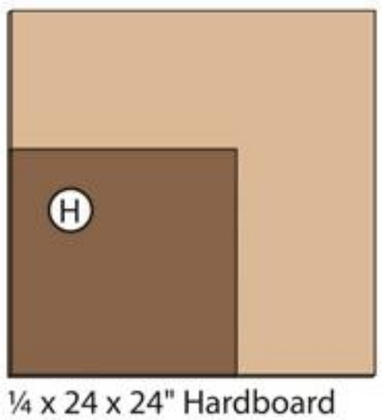
¾ x 3½ x 96" Cherry (2.7 bd. ft.)




1½ x 3½ x 60" Cherry (3.3 bd. ft.)




½ x 24 x 24" Birch plywood




¼ x 24 x 24" Hardboard

## Materials List

| Part | | FINISHED SIZE T | W | L | Matl. | Qty. |
|---|---|---|---|---|---|---|
| A | frame tops/ bottoms | ½" | 1" | 15" | C | 8 |
| B | frame sides | ½" | 1" | 4½" | C | 8 |
| C* | beads | ½" | ⅝" | 15" | C | 4 |
| D | aprons | ¾" | 1½" | 15" | C | 4 |
| E | legs | 1⅜" | 1⅜" | 25" | C | 4 |
| F | bottom | ½" | 16¼" | 16¼" | BP | 1 |
| G* | top-frame pieces | ¾" | 3" | 20½" | C | 4 |
| H | liner core | ¼" | 14⅞" | 14⅞" | H | 1 |

*Parts initially cut oversize. See the instructions.

**Materials key:** C–cherry, BP–birch plywood, H–hardboard.
**Supplies:** Spray adhesive, double-faced tape, #6×½" flathead wood screws (8), ¼" dowel, #20 biscuits (4), #17x1" brads (4), ⅛×4⅞6×14⅞6" glass (4), ¼×15¼×15¼" acrylic or tempered glass, 19×19" felt.
**Blade and bits:** Stack dado blade; ¼" round-over, ½" cove router bits; ⅜2", ¼" drill bits.

220 grit. Cut or have cut a piece of ¼"-thick clear acrylic or tempered glass to fit in the frame. ***Quick Tip! Cut acrylic on your tablesaw.*** An 80-tooth blade with an alternating top bevel grind cuts acrylic cleanly. A zero-clearance throat insert around the blade prevents chipping and cracking.

**3** Mark diagonal lines on top of each leg to locate its center. Drill a ¼" hole ½" deep at each intersection [**Drawing 2**]. To transfer the locations of these holes to the top frame (G), drive a small brad into the hole [**Shop Tip**, *above*] and snip off the head so the brad extends above the leg. Center the top frame on the base. Mark one frame piece and the corresponding side frame (A–D) so you can reposition the top frame, then mark the hole locations [**Photo G**]. Drill ¼" holes ⅜" deep at these marks. Remove the brads from the holes and glue ¾"-long pieces of ¼" dowel into each leg.

**4** Apply a finish. (We used Minwax cherry no. 235, then wiped on three coats of satin polyurethane, sanding lightly between coats with a 320-grit sanding sponge.)

**5** Remove the top (A) from each frame and cut or have cut glass to fit in the frames. Insert the glass in the grooves, and reinstall the tops.

**6** For the liner core (H), cut a piece of ¼" hardboard ⅛" smaller than the opening in the top of the table base. Cut a piece of felt 2" larger in each dimension than the liner core. With the felt facedown on your bench, apply spray adhesive to one face of the liner core and place it on the felt, centered. Smooth out any wrinkles, then flip the core upside down and trim the corners [**Photo H**]. Place the liner in the table; then place the acrylic top in the frame (G) and position the frame on the dowels. Dust off your treasured collectibles and place them in their new protective home.

Produced by **Craig Ruegsegger** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

## MORE RESOURCES

### FREE PLAN

- Find a free plan for making a fairing stick at woodmagazine.com/fairing.

### FREE VIDEO

- Watch a free video showing how to use a fairing stick at woodmagazine.com/fairingvideo.

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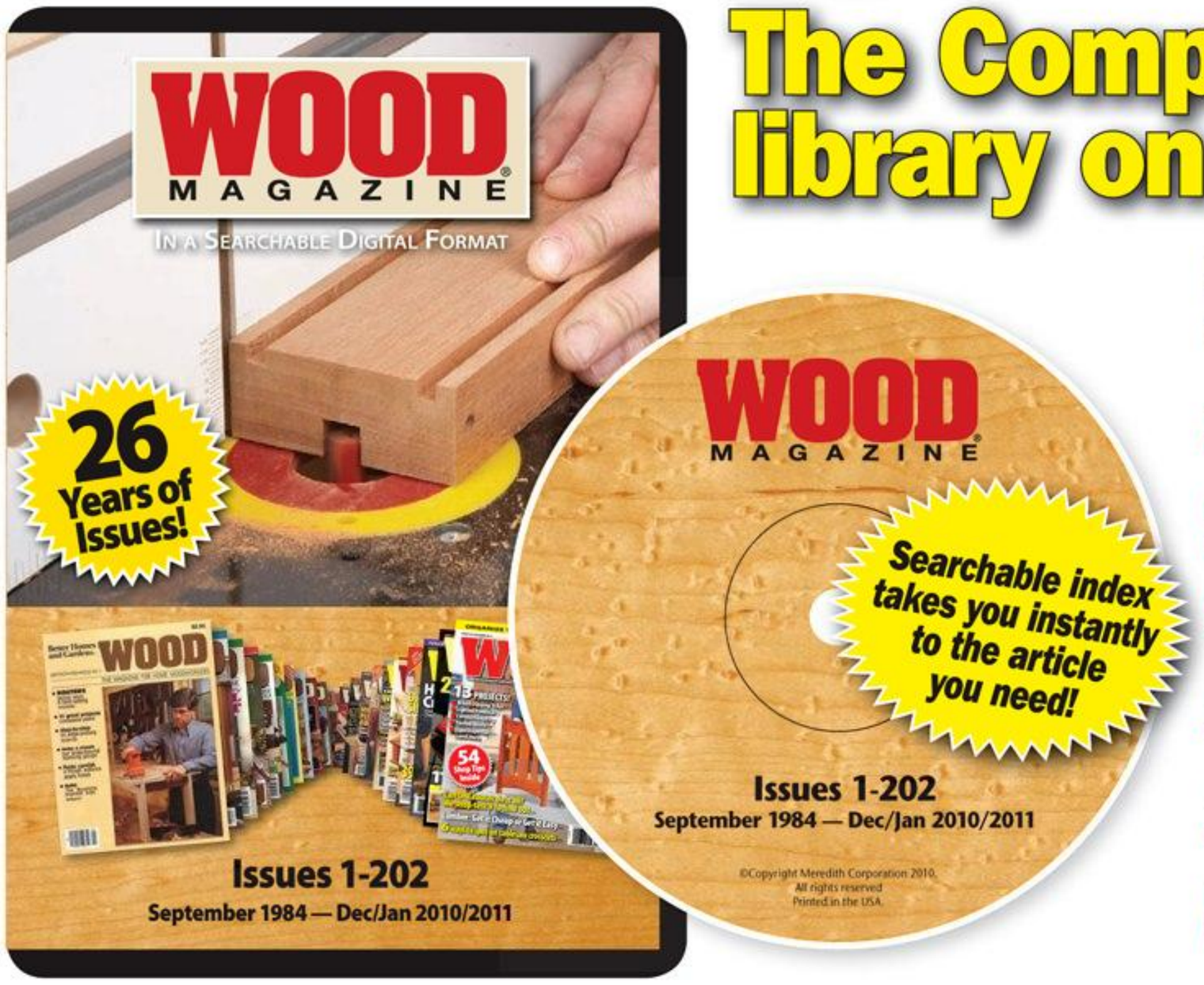
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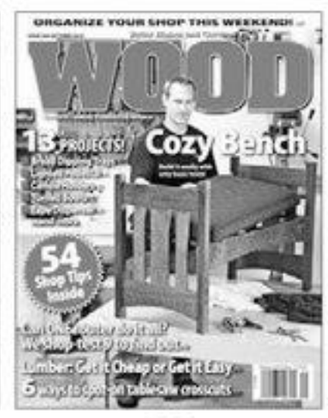


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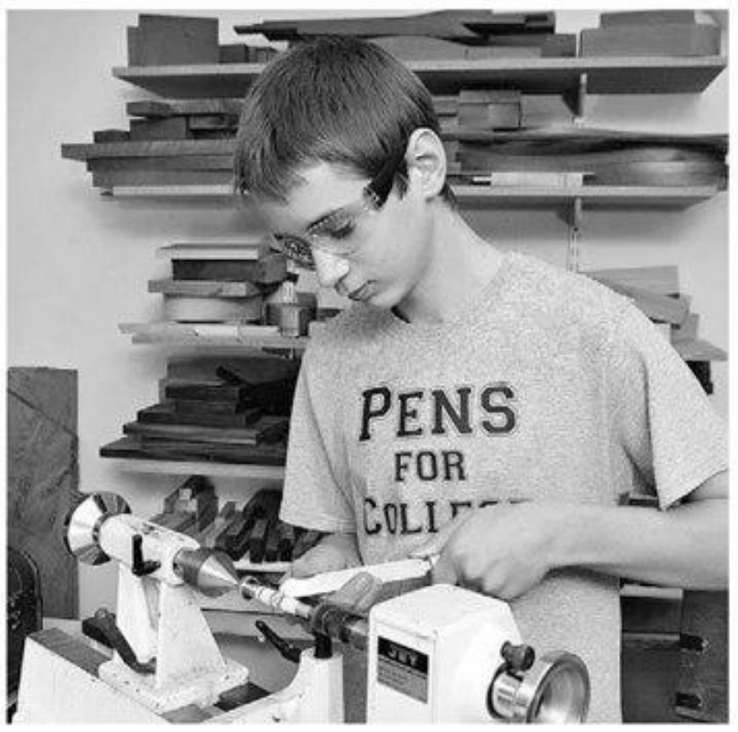

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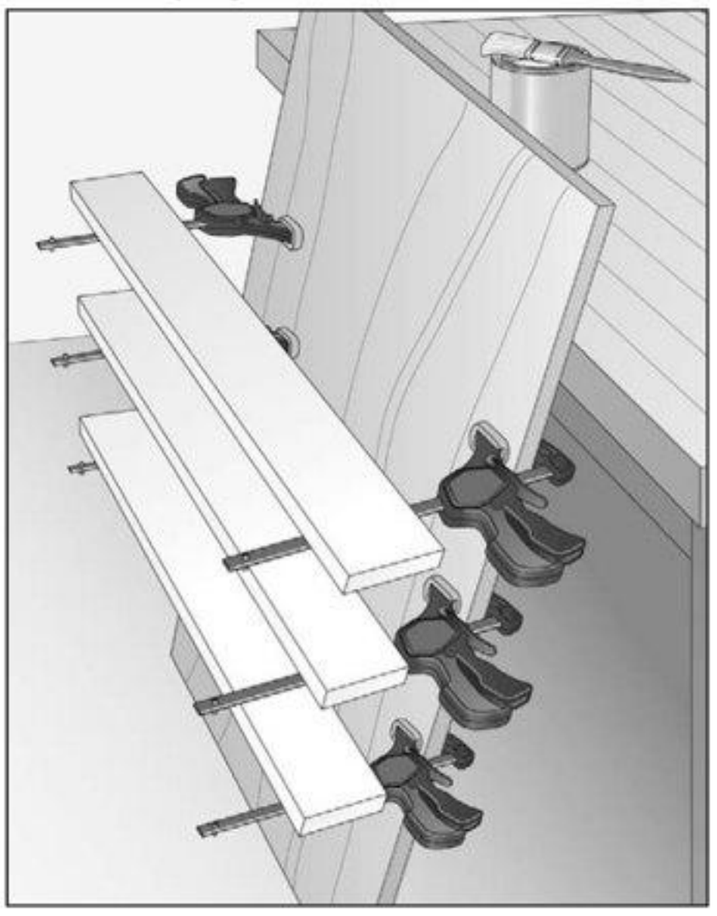

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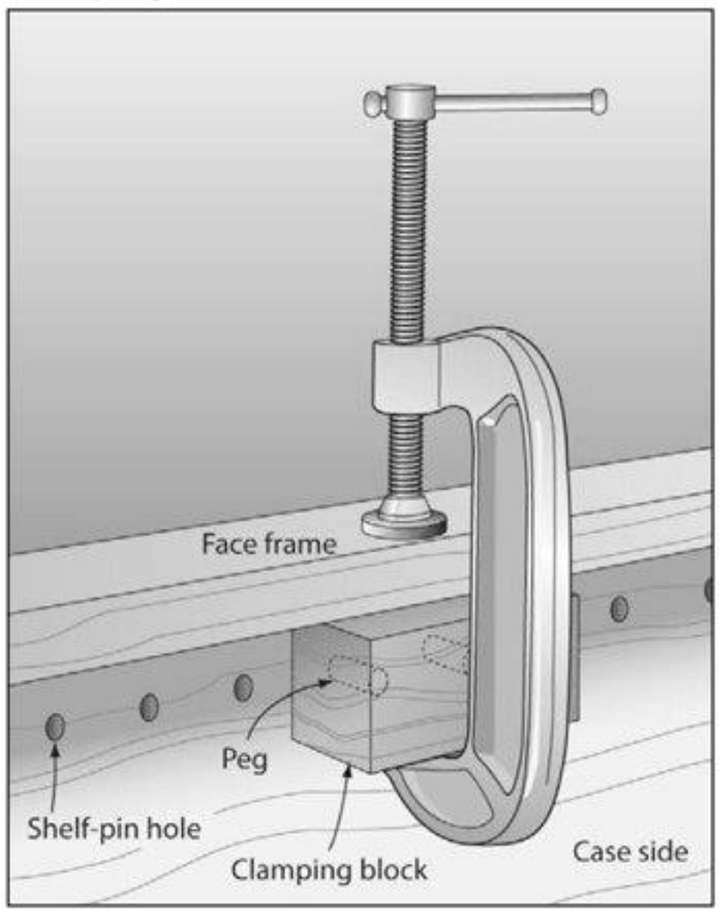


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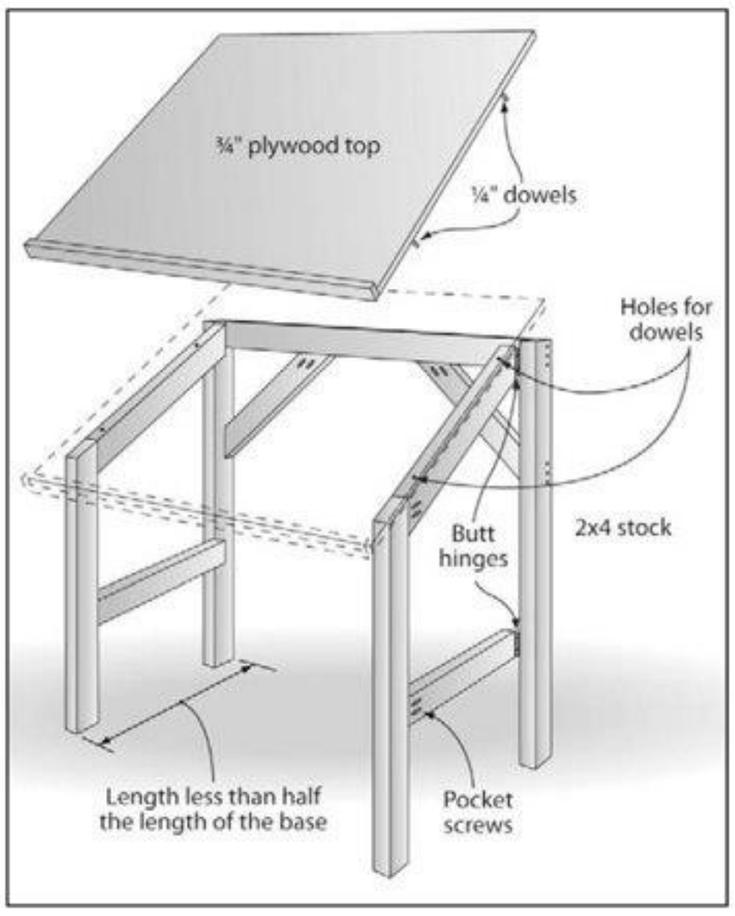

# HOW TO USE THIS INDEX

This annual index includes every article and Shop Tip that appeared in *WOOD*® magazine from the December/January 2009/2010 issue through the November 2010 issue. To quickly find the article you're looking for, first identify the major index category most likely to contain the article:

- Projects (plans with step-by-step instructions)
- Tools & Materials (product reviews and guidance on using tools, accessories, hardware, and wood products)
- Techniques and Features (specific skills and articles of general interest, such as craftsman profiles)
- Shop Tips/Skill Builders (quick ideas you can put to use in your shop today)

Then look for the one word that best describes the project, technique, tool, or shop tip. Articles with two strong descriptors, such as a mission table, may be found under both descriptors—"mission" and "table."

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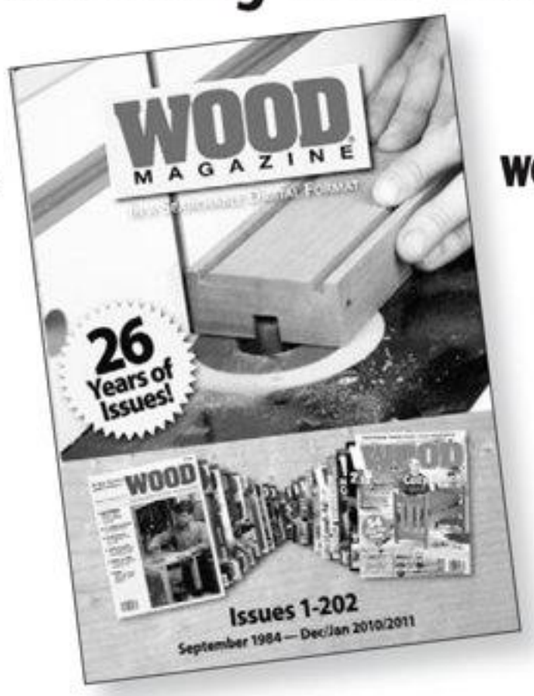


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# 6 Methods to Maximize Your Mitersaw

**Turn your "chop" saw into a precision cutting tool with these helpful tips.**

Few tools can match a mitersaw for portability and quick setup. But the real test for woodworkers comes down to this: Can it make clean, accurate cuts day-in and day-out in a workshop setting?

The answer: a qualified "yes." Right out of the box, some mitersaws deliver furniture-quality cuts. But even the best saws will yield better results if you put into action the following tips.

# Improve cut quality

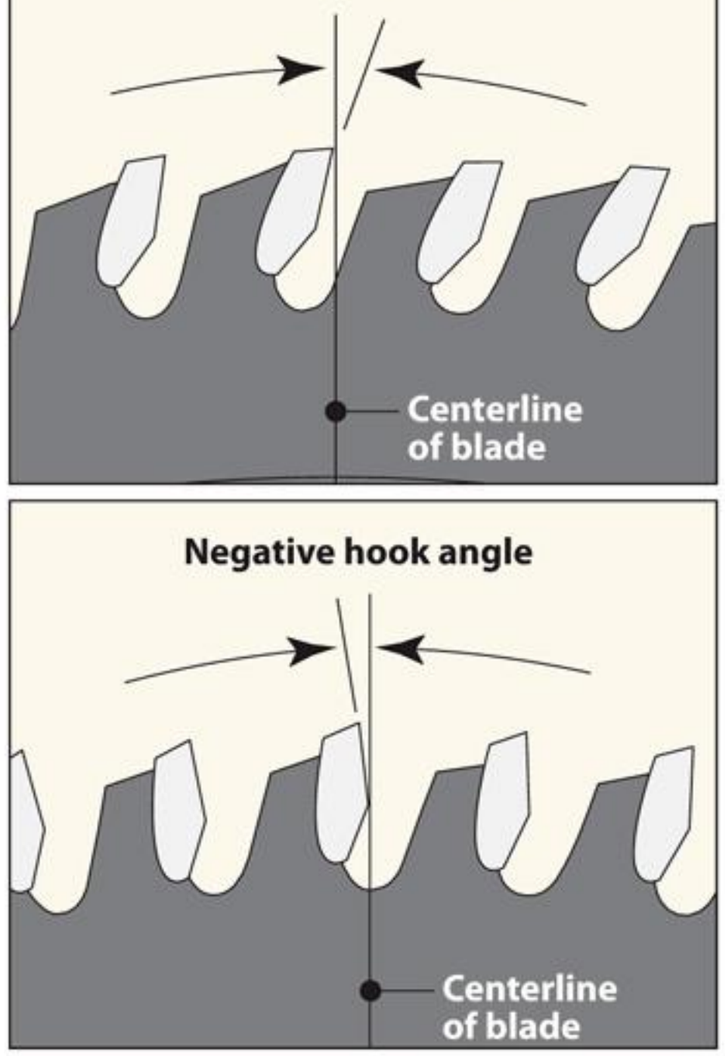
## Tip #1: Upgrade the blade.

Most mitersaws come equipped with a general-purpose 24- to 40-tooth blade suitable for cutting framing lumber or decking, where clean cuts don't matter much. But to make crisp cuts in hardwoods, you'll need a high-performance blade with a low-degree hook angle. (See drawing at *right*.) Get an 80-tooth blade for a 10" mitersaw and a 96- or 100-tooth blade for a 12" model. (We recommend Freud's LU74R010 and LU74R012 blades.)

### MORE TEETH = BETTER CUT

Doubling the number of teeth means each tooth takes a smaller bite, dramatically improving the quality of cut. And using a blade with sharp, clean teeth nets a cleaner cut.

### KNOW YOUR HOOK ANGLE



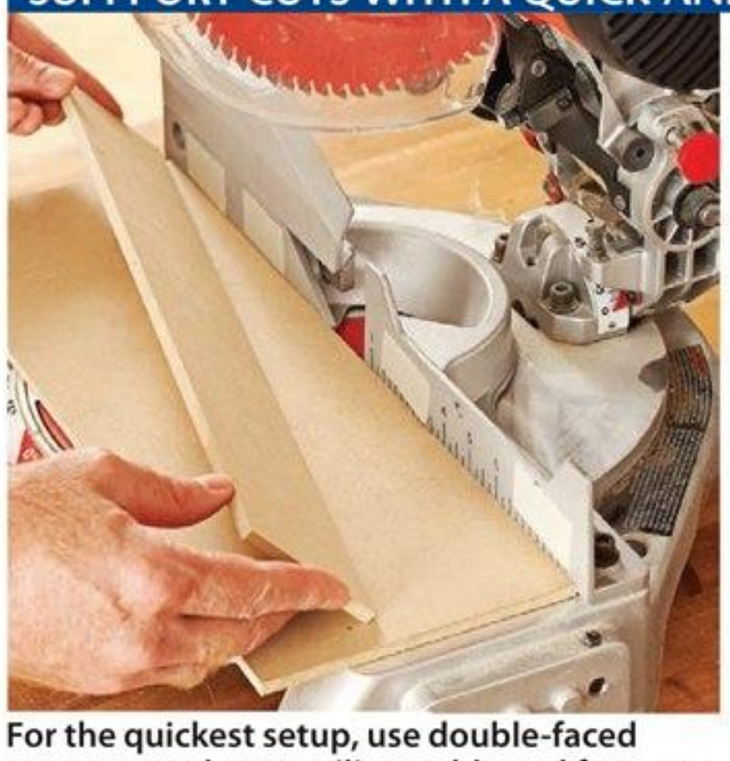

On a mitersaw, blades with positive hook angles above 10° "attack" the wood with aggressive cuts. Negative-hook blades ease into the wood with a "shaving" cut. Your best bet is a blade with a hook angle between 10° and -5°. (Look for this figure on the blade, its packaging, or the manufacturer's Web site.)

## Tip #2: Back up your cuts.

Even if your mitersaw comes with a zero-clearance throat insert plate, it won't be long before overlapping bevel and miter cuts erode that close support. And most mitersaws use ⅛" or thinner plastic inserts, making it nearly impossible to make your own inserts from plywood or MDF.

Instead, install a quick-and-easy auxiliary table and fence made of plywood, MDF, or hardboard, as shown *below*, and you've got instant zero-clearance support to prevent tear-out where the blade exits the cut. Of course, after you make two cuts at different settings, the support between those cuts will fall away. Still, it will continue to give support on one side, so put your "keeper" piece to that side. When your auxiliary fence and table no longer do the job, simply replace them with new ones.

### SUPPPORT CUTS WITH A QUICK-AND-EASY TABLE AND FENCE



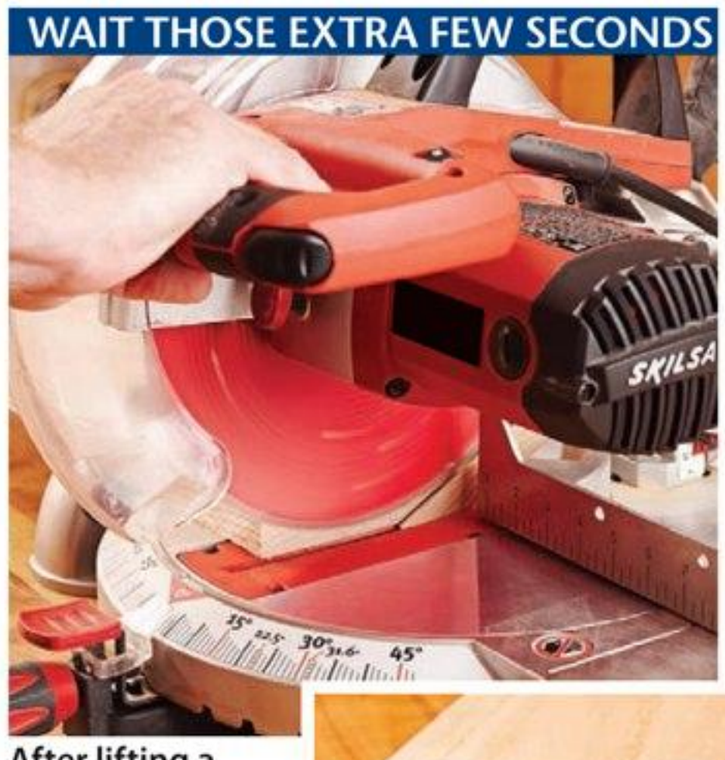
For the quickest setup, use double-faced tape to attach an auxiliary table and fence to the saw's table and fence.

For a longer-lasting backer, attach an auxiliary fence with screws, after screwing the table to the fence.

## Tip #3: Stop before you lift.

After making a cut on your mitersaw, always allow the blade to stop spinning before lifting the saw. Prematurely raising it could score the end of your workpiece. The spinning blade could also snag the cutoff and dangerously propel it at a high speed.

### WAIT THOSE EXTRA FEW SECONDS



After lifting a spinning blade *(above)* we chalked the cut. It revealed scoring marks on the end grain *(right)*.

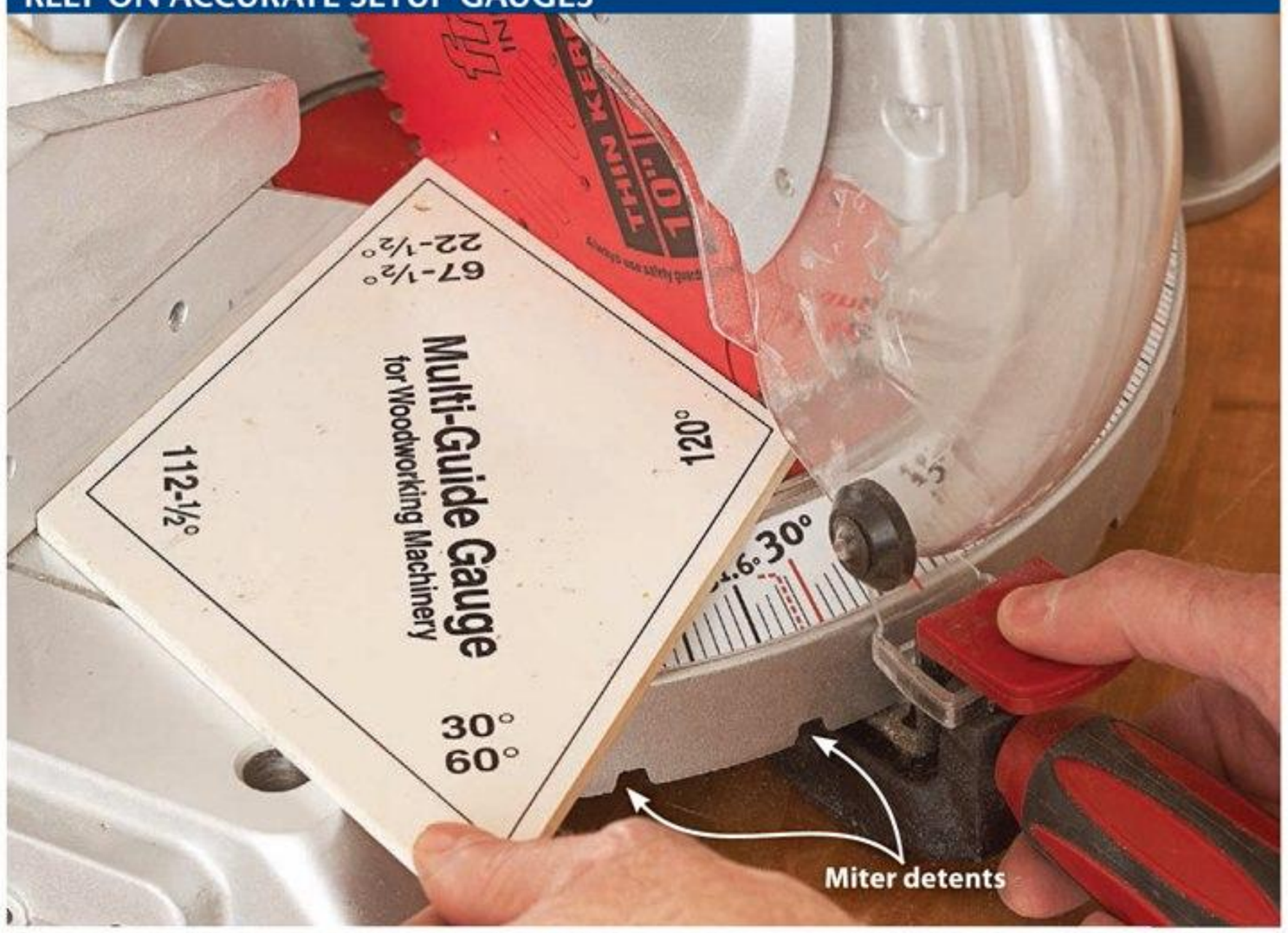
# Aim for greater accuracy

## Tip #4: Get reliable help.

If your mitersaw doesn't cut perfectly square at 90°, check the owner's manual for the necessary adjustments and dial it in for perfect cuts. The best saws have miter scales that you adjust to correct inaccurate settings, but with most saws, you adjust the fence to the blade—often a finicky task. Some saws don't have any adjustment at all.

If your saw's scale proves unreliable (or unadjustable), put your trust instead in reliable squares, drafting triangles, angle blocks, or setup guides to position your saw for each cut. Be sure to reference your guide or square against the blade's flat body rather than the teeth to ensure absolute accuracy.

**RELY ON ACCURATE SETUP GAUGES**




If your saw wants to drop into an inaccurate detent, bypass it and secure the miter lock while aligning the blade to a known-to-be-accurate gauge.

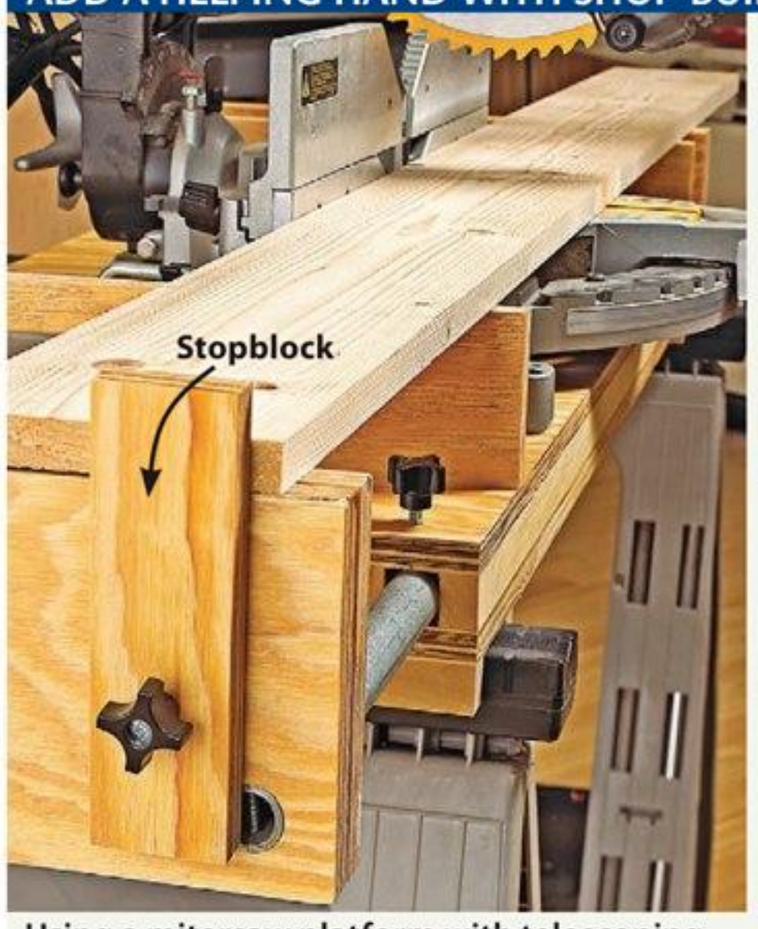
## Tip #5: Extend your support.

Most mitersaw tables measure about 18" wide, and some include extension wings that add another foot or two of stock support when pulled out. But for longer workpieces that prove tippy on these setups, you need support to prevent boards from tilting or lifting off the table. You can do a few things here to ensure precision.

First, add a couple of scrapwood blocks that match the saw's table height, placing them near the ends of your boards. Or mount your mitersaw on a collapsible stand that includes workpiece supports and stops. These sell for $100–$300.

For a third option, particularly if you dedicate your saw to a bench in the shop, make your own extensions with measuring rules on each side of your saw. Custom-make a bench or portable system—you can find project plans at woodmagazine.com/mitersupport—or buy a premade setup, *below*, for less than $200. Add flip-stops or clamp-on stopblocks for repeated cuts of the same length.

**ADD A HELPING HAND WITH SHOP-BUILT OR COMMERCIAL SYSTEMS**

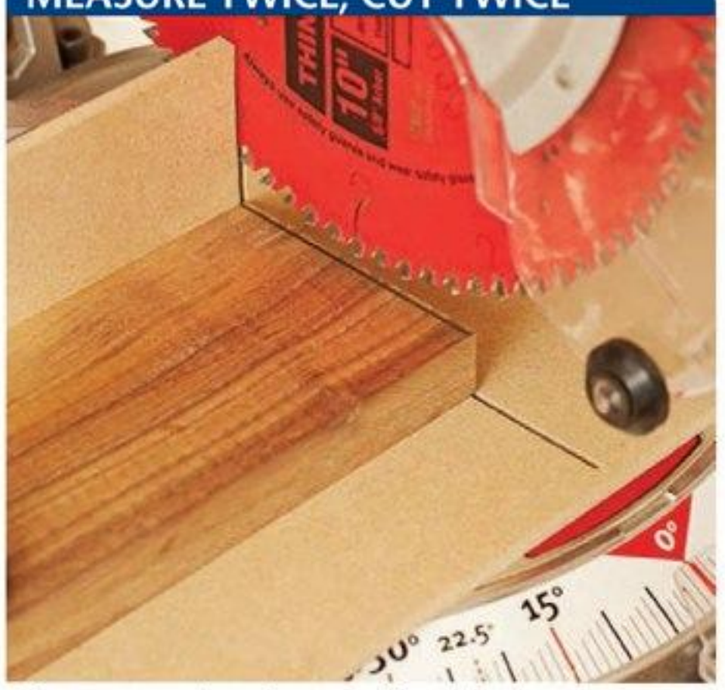



Using a mitersaw platform with telescoping extensions gives you horizontal support as well as a stopblock for making repeated cuts.

## Tip #6: Sneak up on cuts.

Mitersaw blades can flex during tough cuts in hardwoods, but you can prevent this by making your cuts in two steps. First, make an initial cut about 1/16" to the waste side of your cut line. Then cut to the line. This finishing cut, about half as wide as normal, will be cleaner and spot-on square.

**MEASURE TWICE, CUT TWICE**




After removing the cutoff, nudge your workpiece closer to the blade until the teeth line up with the mark, and make the final cut.

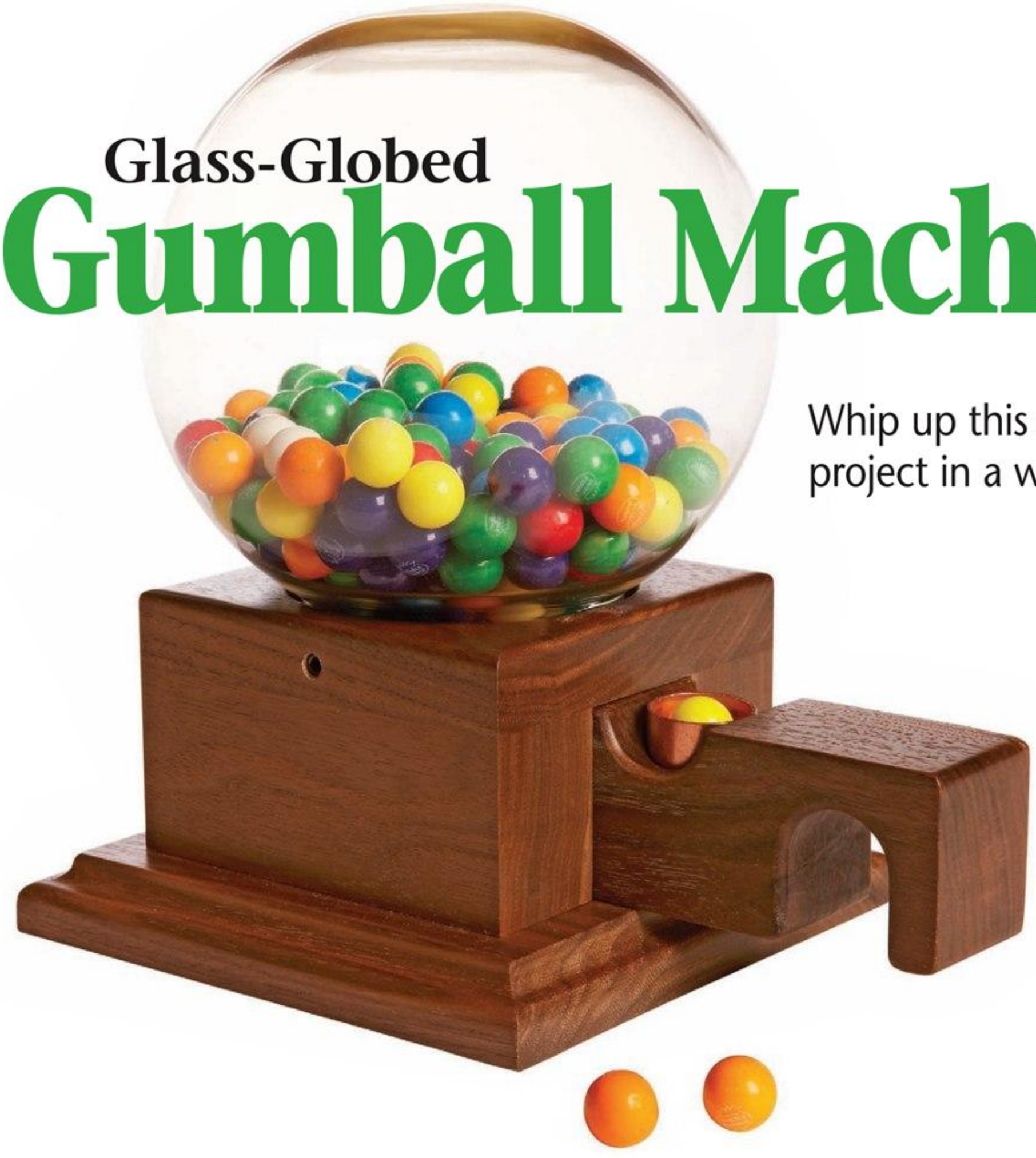
Produced by **Bob Hunter**
with **Kevin Boyle** and **Jeff Mertz**

## Sources

**Miter table systems:** Biesemeyer 6' Miter Table, 10" saws, #78-806, $175; 12" saws, #79-806, $195; mikestools.com or 714-558-8360.
Precision Trak & Stop 8' System, #KMS8000, $140, Kreg Tool, 800-447-8638 or kregtool.com.

# Glass-Globed Gumball Machine

Whip up this sweet little project in a weekend.



## PROJECT HIGHLIGHTS

- Overall dimensions: 6" wide × 7" deep × 8½" high.
- Find a variety of glass globes and all the hardware at a home center.
- Rummage through your scrap bin for wood for several machines.

Simple to build and simple to use defines this child-pleasing project. You need only push in its dispenser to allow a treat to drop into a copper cap. Pulling the dispenser out retrieves the tasty treat.

Before machining any parts, measure the globe that holds the gumballs. (You find them in the lighting department at home centers and hardware stores.) The base of our globe measured 3⅛" in diameter. If you use one of a different size, adjust dimensions to fit it.

## Start body-building

1 From 8/4 stock (or laminated stock), prepare a 1½×1¾×16" blank. (We used walnut.) From this blank, cut the back (A) and dispenser (B) to size [**Materials List,** *page 54*]. Set these parts aside for the moment.

2 Rip or plane the remaining blank to 1⅜" thick. Cut the two sides (C) to length from this blank.

3 Retrieve the back (A) and glue it between the sides (C), flush at the top, bottom, and back [**Drawing 1**].

## Top it off

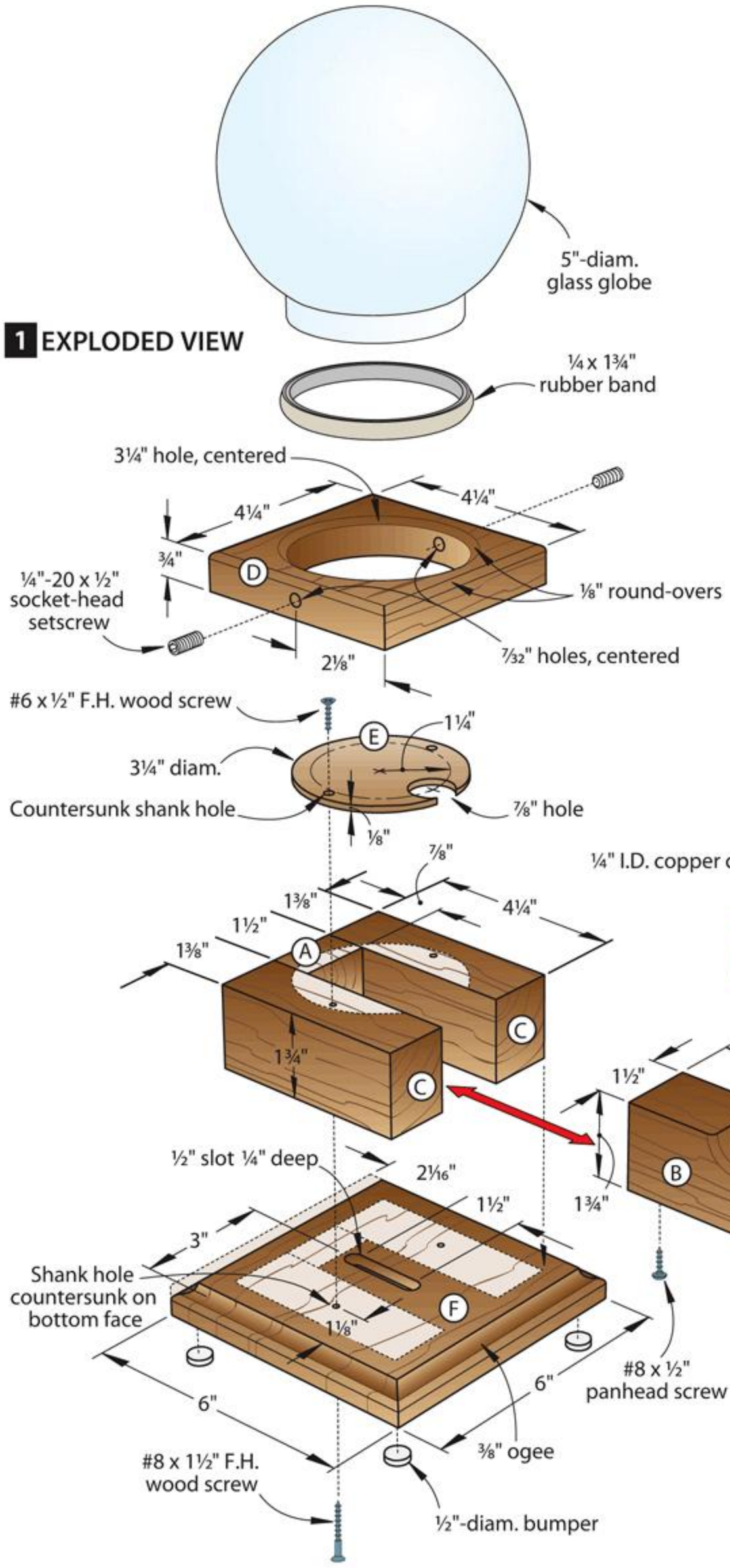
1 Cut the top (D) from ¾"-thick stock to match the length and width of the body (A/C) [**Drawing 1**]. Lay out and drill 7/32" holes ⅝" deep for the two set-screws that hold the globe in place. Use a bolt to tap threads in each hole [**Shop Tip** on *opposite page*].

2 Set a compass to draw a circle ⅛" larger than the globe's base; then lay out the opening centered on the top (D). (Don't change this compass setting—you'll need it again shortly.) Drill a ⅜" starter hole inside the circle, and then jigsaw or scrollsaw to within 1/16" of the line. Sand up to the line using a sanding drum mounted in a drill press.

3 Install a ⅛" round-over bit in your table-mounted router, and rout round-overs on the circle cutout and the outside edges of the top (D) [**Drawing 1**].

4 Glue the top (D) to the body assembly (A/C) so the edges are flush all

**1 EXPLODED VIEW**

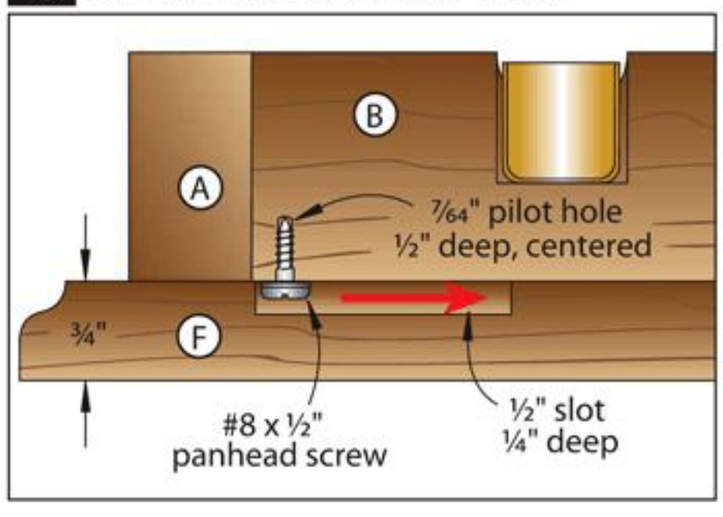


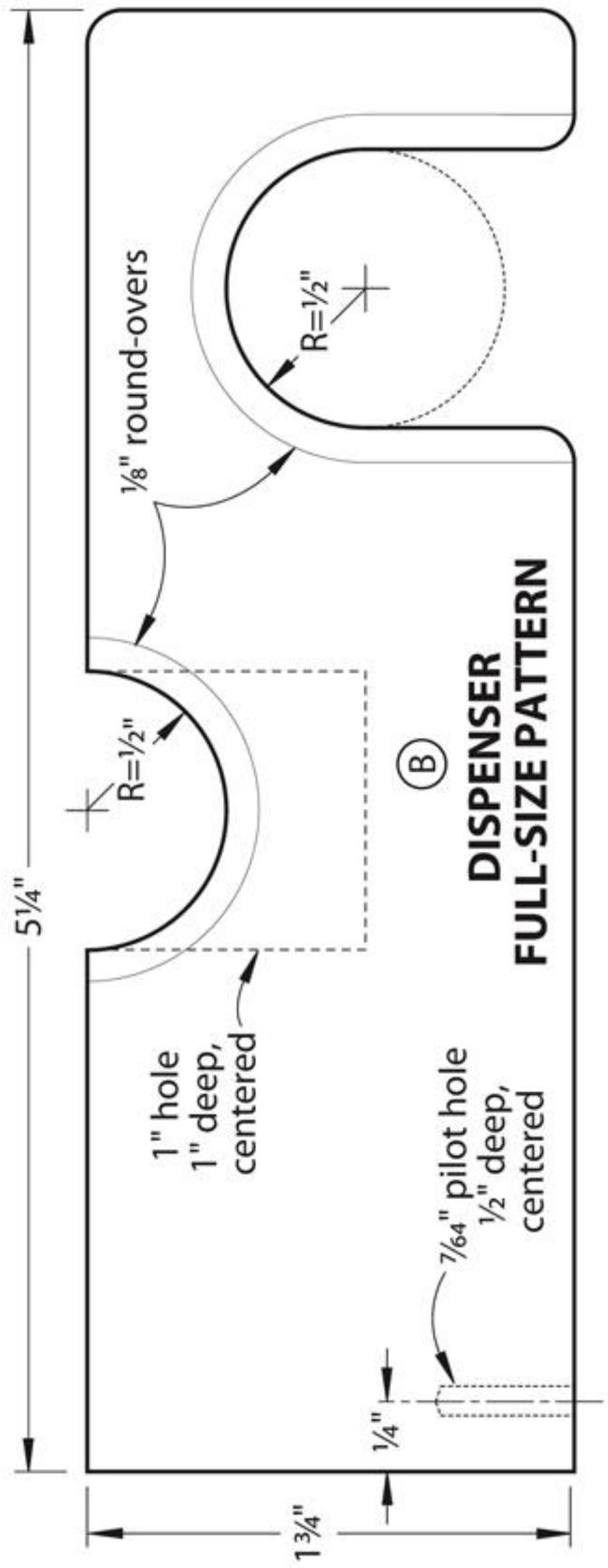

around, and the setscrew holes face to the sides. After the glue dries, finish-sand the assembly to 220 grit.

## Going in circles

1 Mark a point for the center of the restrictor plate (E) on a piece of ⅛" tempered hardboard. Using the compass with the saved setting, draw a circle around this centerpoint. To lay out the hole that the gumball falls through, reset the compass to 1¼" and, using the

**1a DISPENSER SECTION VIEW**

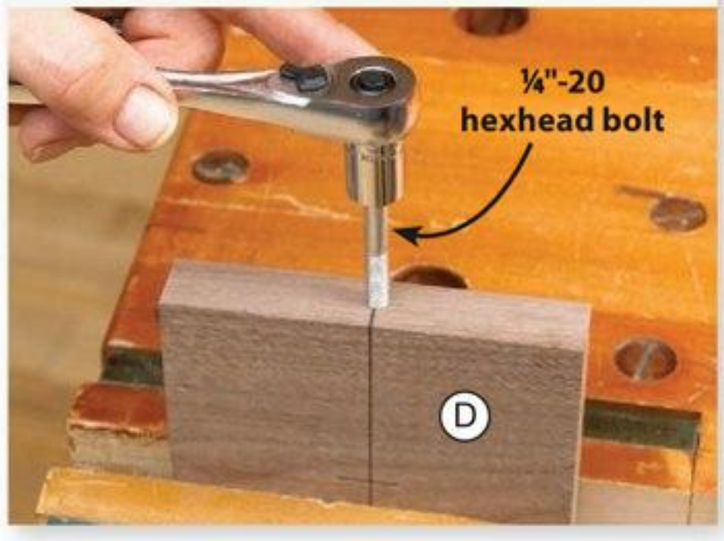



## SHOP TIP

### Use a bolt to tap threads

To prethread the holes for the setscrews, drive a ¼"-20 hexhead bolt into each one. Rub some wax on the bolt threads so it turns easily. Keep the bolt perpendicular to the edge as you go, and back it out now and then to clear shavings.



same centerpoint, draw a circle inside the first [**Drawing 1**]. Drill a ⅞" hole with its centerpoint on the inner circle.

**2** Cut the restrictor plate (E) on the outside layout line, and check that it fits inside the opening in the top (D). Sand the restrictor plate to fit if needed. Then, drill and countersink two ⁹⁄₆₄"-diameter shank holes [**Drawing 1**]. Screw the restrictor plate to the body assembly (A/C/D), centering the hole between the sides (C) and toward the open end of the body assembly.

## Make the dispenser

**1** Photocopy the **Dispenser Pattern** from *page 53*, and spray-adhere it to the dispenser (B). Scrollsaw or jigsaw the finger pull and cup locations just outside the lines; then sand the cutouts smooth. Round over the edges where shown in **Drawing 1**, using a ⅛" round-over bit in a table-mounted router.

**2** Chuck a 1" Forstner bit into the drill press and bore the hole for the gumball cup in the dispenser (B) [**Photo A**].

**3** Drill a pilot hole where indicated on the dispenser pattern, and drive in a #8×½" panhead screw [**Drawing 1a**].

## Base, assembly, and gum

**1** Cut the base (F) to size. Lay out and drill the ends of the slot that traps the screwhead in the bottom of the dispenser (B) [**Drawing 1**]. Drill out the waste between the holes, and clean up the slot edges with a chisel [**Photo B**].

**2** Chuck a ⅜" ogee bit into a table-mounted router. Rout around all four sides of the base (F). Start across the end grain so any chip-out is removed when you rout the adjacent edge grain.

**3** Clamp the body assembly (A/C/D/E) to the base (F) centered front to back and side-to-side. Drill and countersink ⁵⁄₃₂" shank holes through the base [**Drawing 1**] and ⁷⁄₆₄" pilot holes through the shank holes and into the sides (C).

**4** Unclamp the pieces, finish-sand all parts to 220 grit, and then apply a finish. (We applied three coats of spray-on polyurethane, buffing between coats with a 320-grit sanding sponge.)

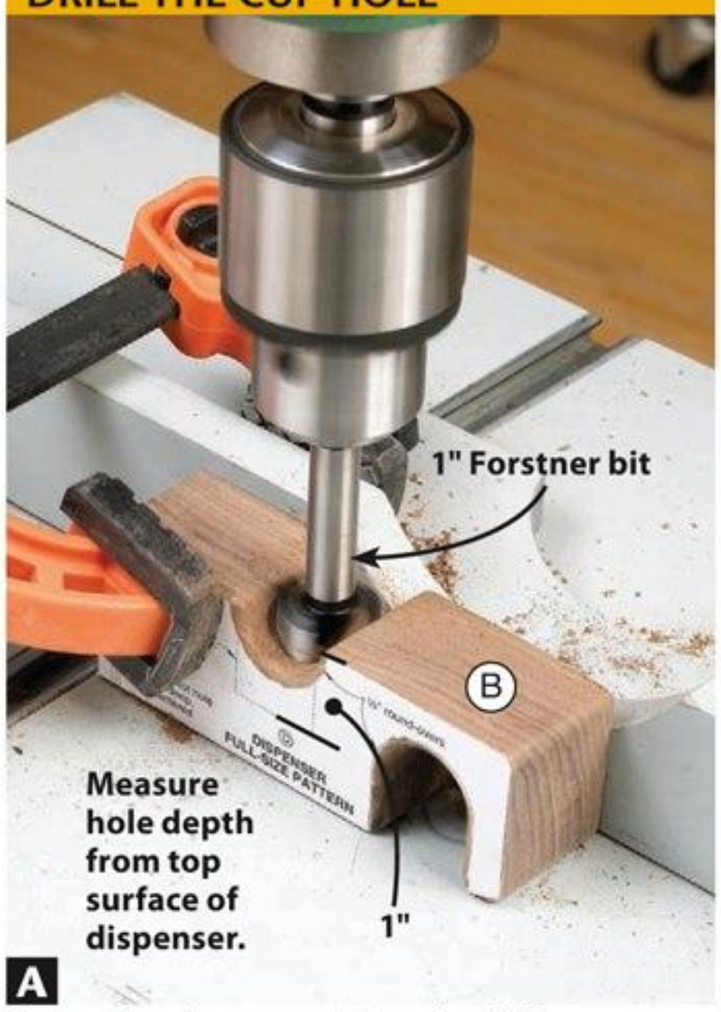
***Note:*** *Allow the finish to dry thoroughly before filling the machine with gumballs.* Affix the bumpers to the base bottom.

**5** Put the dispenser (B) in place between the base (F) and body assembly (A/C/D/E). Confirm that the dispenser moves in and out easily and that the panhead screw on its bottom prevents the dispenser from sliding out completely. (If the dispenser sticks slightly, wax it.) Screw, don't glue, the body assembly to the base.

**6** Thread the setscrews into the top (D) so they are just flush with the inside edge of the cutout. Place the rubber band around the base of the globe. Fill the globe with gumballs, turn the machine upside down, and place it onto the globe. Flip the machine and globe upright, and lightly snug the setscrews to secure the globe. (Over-tightening the screws could crack the glass.) Place a copper cap in the dispenser (B). Push the dispenser in, pull it out, and enjoy in moderation.

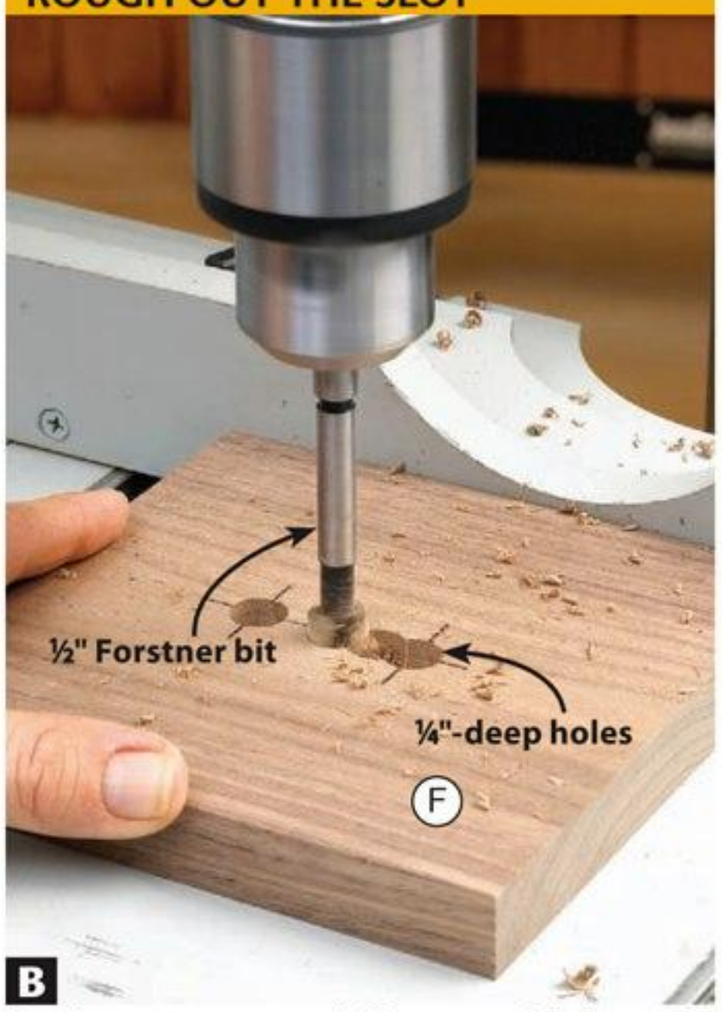
Produced by **Craig Ruegsegger** with **Jeff Mertz**
Project design: **Richard Burton, Nokomis, Fla.**
Illustrations: **Roxanne LeMoine; Lorna Johnson**

**DRILL THE CUP HOLE**




Clamp the dispenser (B) to the drill-press fence, and center a 1"-deep hole in the cutout for the gumball cup.

**ROUGH OUT THE SLOT**




Set the stop on your drill press to ¼" deep. Bore the end holes first, then drill a series of overlapping holes between them.

## Materials List

| Part | | FINISHED SIZE T | W | L | Matl. | Qty. |
|---|---|---|---|---|---|---|
| A* | back | 1½" | 1¾" | ⅞" | W | 1 |
| B* | dispenser | 1½" | 1¾" | 5¼" | W | 1 |
| C* | sides | 1⅜" | 1¾" | 4¼" | W | 2 |
| D | top | ¾" | 4¼" | 4¼" | W | 1 |
| E | restrictor plate | ⅛" | 3¼" diam. | | HB | 1 |
| F | base | ¾" | 6" | 6" | W | 1 |

*Parts cut from one blank. See the instructions.

**Materials key:** W–walnut, HB–tempered hardboard.
**Supplies:** Spray adhesive, #6×½" flathead wood screws, #8×½" panhead screw (1), #8×1½" flathead wood screws (2), ¼"-20×½" socket-head setscrews (2), ½"-diam. bumpers (4), ¾" inside-diameter copper cap, ¼×1¾" rubber band, 5"-diam. glass globe.
**Bits:** ⅜" ogee, ⅛" round-over router bits; ½", ⅞", and 1" Forstner bits.

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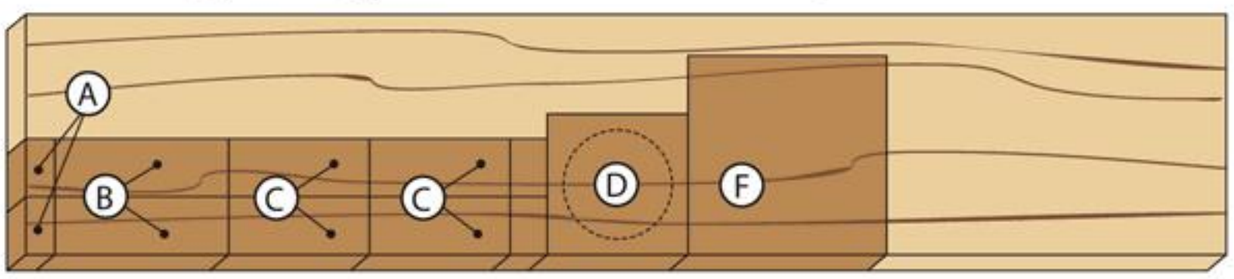
## Cutting Diagram




¾ x 7 x 36" Walnut (2 bd. ft.)

⅛ x 5 x 5"
Tempered hardboard

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SHOP TESTED

# 10" Sliding Mitersaws

With all the choices in mitersaws these days (sliders and non-sliders alike), a 10" sliding compound mitersaw provides the best combination of accuracy, cut capacity, power, price, and portability. Nonsliding saws, though reliably accurate, lighter, and less expensive, lack the crosscut capacity of sliders—up to 50 percent less with 10" models and 33 percent less with 12" saws. On the other hand, 12" sliders provide an extra inch or so of vertical cut capacity (a bonus when cutting moldings standing against the fence), but crosscut about the same as 10" sliders, weigh up to 40 percent more, and cost another $100 to $200. If we've convinced you of the merits of a 10" slider, read on to find out which one gives you the most bang for your buck.

## Accuracy proves critical for fine woodworking

In a woodshop setting a mitersaw must deliver precise cuts for tight-fitting joinery. Fortunately, all 10 tested sliders met the challenge, although most required some adjustments before they could make dead-on cuts. To ensure the saws could maintain that accuracy, we made loads of cuts, rocked them back and forth through their miter and bevel ranges, tossed them into the back of a pickup truck, and even whacked them a few times with a board to simulate wear. All held fast.

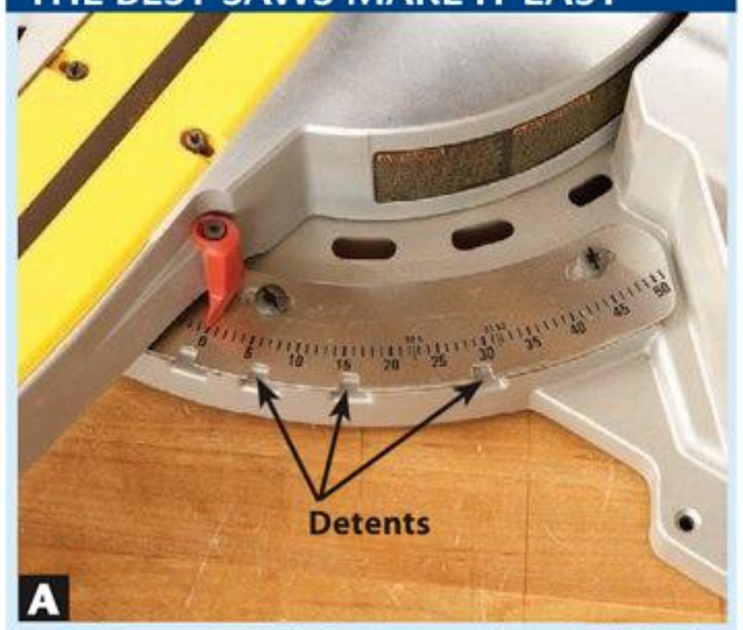
## Count on miter settings for repeatable cuts

Each of the tested saws has miter detents for 0°, 15°, 22½°, and 45° on the left and right sides [**Photo A**]. All but the Ryobi TSS100L also have a stop at 31.6° on both sides for cutting crown molding lying flat. Five saws (Bosch 4405, Bosch

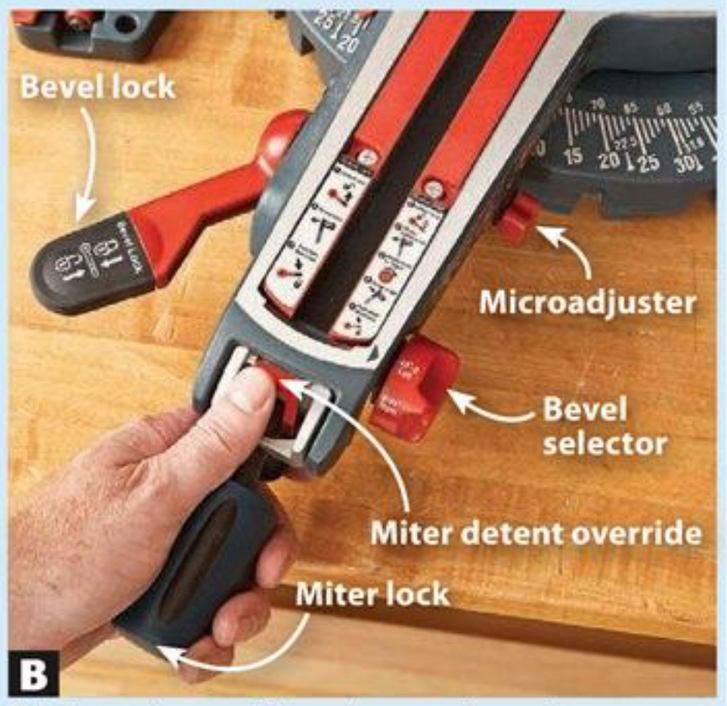
4410, DeWalt DW717, Jet JMS-10SCMS, and Makita LS1016L) also have a 60° detent on one side. That's nice if you need it because you can't even make that cut on a tablesaw without a jig or miter-gauge upgrade.

For occasions when you need to tweak a miter setting by fractions of a degree—custom-cutting an out-of-square joint, for example—it pays to have a mitersaw with a detent override. This feature [**Photo B**] lets you nudge the miter-angle setting ever so slightly without engaging the detent; then lock it securely in place. Saws with a detent override: Bosch 4405 and 4410, Craftsman 21201, and DeWalt. The Bosch 4410 and Craftsman 21201 also incorporate a microadjuster [**Photo C**], enabling you to fine-tune a miter setting with mechanical precision.

## SETTING MITER ANGLES: THE BEST SAWS MAKE IT EASY




To calibrate DeWalt's miter scale, simply lock the blade square to the fence, and then align the metal miter-scale plate.




All the miter and bevel controls and instructions for using them on the Bosch 4410 sit at the front of the saw for easier use.

We found the Craftsman 21201 scale easiest to use because of its half-degree increments; the other tested saws have 1° markings.

## BEVEL SCALES SHOULD BE EASY TO READ ON ANGLES WITHOUT STOPS

Makita's bevel angle can be set by reading either of two scales, giving you good visibility no matter which way you tilt the saw.

The fat cursor line and closeness of Ryobi's bevel-angle markings make it difficult to accurately set an angle without a stop.

## Easy-to-use features make bevel cutting hassle-free

All the saws tilt at least 45° to the left to make *compound* cuts, a combination of bevel and miter angles. And most (see the chart on *page 60*) tilt at least that much to the right. If you plan to make a lot of beveled or compound cuts, you'll appreciate the up-front bevel lock on the Bosch [**Photo B**] and Jet saws. DeWalt's bevel lock sits on top of the sliding rails—not quite as accessible, but still better than the rear-mounted locks on the rest.

The best bevel-action mitersaws have cylindrical scales [**Photo D**] on the rear hub with wide spacing between lines, making them easier to read. For quick reference, all the saws have bevel stops at 0° and 45°, and most also have crown-molding stops or markings at 33.9°. The DeWalt and Makita models also have 22.5° stops.

## Seek the support of tall fences and long tables

For those times when you cut tall or long stock, you'll appreciate the support from a good mitersaw fence and table. The Bosch 4410, Craftsman 21201, DeWalt, Kobalt SM2505LW, and Makita have the best fences, standing at least 4" high with top sections that slide out of the way for making bevel cuts. Conversely, fences on the Jet and Ryobi, both below 2", lack sufficient height to support workpieces twice that height. For these, attach an auxiliary plywood fence for maximum workpiece support.

For workpieces longer than 2', you'll like the added support of extensions, standard equipment on both Bosch and Craftsman saws as well as Kobalt and Ryobi. In addition to support, you get a work-holding clamp on all the saws. We prefer clamps that mount behind the fence and hold stock down against the table, rather than the horizontal clamp on the Craftsman 21201, shown on the *next page*.

## Other factors to consider before getting a slider

- **Power.** Although all the saws cut through 4×4 treated pine with no difficulty, three bogged down when we crosscut 12"-wide, 1¾"-thick white oak: the Craftsman 21237, DeWalt, and Kobalt. Still, they made the cut when we slowed the feed rate.
- **Cut capacities.** We didn't find significant differences between the test saws' crosscut capacities, no matter the miter or bevel angles. However, when cutting stock on edge against the fence, the DeWalt (6") and Makita (5¼") have a 1–2" advantage over the rest of the field.
- **Plunge, slide action.** For safest operation we prefer a saw that plunges and slides with no hitches or stiffness. The action on the DeWalt and Makita felt smoothest.
- **Cut quality.** We tested each saw in various hardwoods as well as treated pine, using both the factory blade and a premium replacement blade. Makita's blade produced the best factory cuts out of the box, with no tear-out and only

# The inside scoop on 10" sliding mitersaws

### Bosch 4405, $425

**877-267-2499, boschtools.com**

**+ Hits:** Bosch's scaled-down slider has a lot going for it: a miter range of 60° right to 52° left with a detent override; miter and bevel stops for cutting crown molding; a front-mounted bevel lock; extension wings that add 7½" of support to each side; a tall, adjustable fence with etched scales for quick reference; and a dual-position safety-switch trigger.

**– Misses:** This saw bevels only to the left. Its cast-aluminum miter scale has wide increment markings and proves difficult to set non-detent angles. The blade guard creates a slight hitch that you must push through before you can plunge the saw. You cannot adjust the throat-plate kerf opening. Its 4½' power cord almost always will need an extension cord. And the porous dust-collection bag allows fine dust to pass through and become airborne.

### Bosch 4410, $550

**877-267-2499, boschtools.com**

**+ Hits:** For $125 more than the Bosch 4405, you get the same miter range and detents with override. But this model adds a microadjuster, right-tilting bevel capabilities with a better scale, table extensions for 7½" of more support, a multiposition handle, and nearly twice the power-cord length.

**– Misses:** It has the same miter scales, blade-guard hitch, throat plate, and dust bag as the 4405. In addition, the blade guard does not lock out of the way when changing blades. At 62 pounds, it's the heaviest saw in the test.

### Craftsman 21237, $250

**800-383-4814, craftsman.com**

**+ Hits:** With few frills, this saw proved best among the $250-and-less models, with a miter range of 50° right and left with nine detents, as well as table extensions and cutoff stops.

**– Misses:** It bogged down when cutting thick hardwoods, requiring a slower feed rate, and we found the plunge and sliding action stiff. The 21237 bevels only to the left, and when making 45° beveled cuts the blade guard gets in the way and must be lifted manually to line up a cut. Its 4½' power cord almost always will need an extension cord. There's no onboard storage for the blade-changing tool.

slight scoring marks. When we replaced all blades with a Freud 80-tooth crosscut model (#LU74R010), each saw produced nearly flawless cuts.

■ **Handle/power switch.** Although we prefer a horizontal handle because of its natural hand positioning—Hitachi has the only vertical handle—it's really a matter of preference. The Bosch 4410 gives you the ability to choose with a handle that rotates 90° to four positions.

All saws except the Craftsman 21201, DeWalt, Jet, and Ryobi include a secondary thumbswitch that must be depressed before you can engage the saw's trigger. Bosch's saws feature dual thumbswitches, making them equally suited for left-handed or right-handed use.

■ **Lasers.** The best cut-indicating lasers (Hitachi's and Makita's) mount in front of the blade and shine down in clear, bright red for easy use; they're also simple to adjust. Although Jet's rear-mounted laser tends to get covered with dust, its bright green beam proved most visible in bright sunlight.

■ **Dust collection.** By nature, all mitersaws have difficulty gathering the shotgun blast of debris into the attached bag. Still, Hitachi and Makita deserve credit for doing a better job than the rest. Hooking up a shop vacuum to all the tested saws greatly improved their dust collection, but nonstandard port sizes required adapters and duct tape to fit the hose to most saws.

■ **Depth-of-cut limits.** You might not know it, but sliding mitersaws have a depth stop that you set to limit the depth of cut, as you'd do for cutting dadoes, rabbets, or half-laps with repeated cut-and-slide passes. (To learn how to cut precision dadoes, rabbets, and half-lap joints read "Sliding Mitersaw Joinery" on *page 20*.) The best saws—all but the Bosch 4405, Hitachi, and Ryobi—let you set a stop and slide it aside for full-depth cuts, and then be able to return to it quickly.

■ **Throat plates.** The DeWalt, Hitachi, Jet, and Makita saws have adjustable throat plates that you can close up against the blade for zero-clearance protection from wood tear-out.

## Craftsman 21201, $450

**800-383-4814, craftsman.com**

**+ Hits:** The only model in the test with a miter scale marked in half-degree increments, it also has a detent override and microadjuster for fine-tuning cuts. It miters and bevels 47° both right and left. The single extension wing with cutoff stop adds 25" of workpiece support.

**– Misses:** Its plunge and sliding actions were stiff. Although a useful feature, the microadjuster drags against the saw table when changing miter positions. Its horizontal workpiece clamp sometimes lifted boards slightly off the saw table; we'd prefer a traditional hold-down clamp. You cannot adjust the throat-plate kerf opening.

## DeWalt DW717, $500

**800-433-9258, dewalt.com**

**+ Hits:** This saw tops the test in miter range (60° left, 52° right) with 10 detents and an override, as well as the largest bevel range (48° each way) with seven stops. And it can cut a 6"-wide board on edge, nearly double most of the saws. Should it ever need realignment, the miter scale recalibrates easily, and its lever-action miter lock is our favorite because it locked solidly, was easy to lift and depress, and didn't stick out as far as the competitors.

**– Misses:** It bogged down slightly when cutting thick hardwoods, requiring a slower feed rate. When making 45° beveled cuts the blade guard gets in the way and must be lifted manually to line up and make a cut. The blade guard does not lock out of the way when changing blades. Optional extension wings cost $35 each.

## Hitachi C10FSH, $450

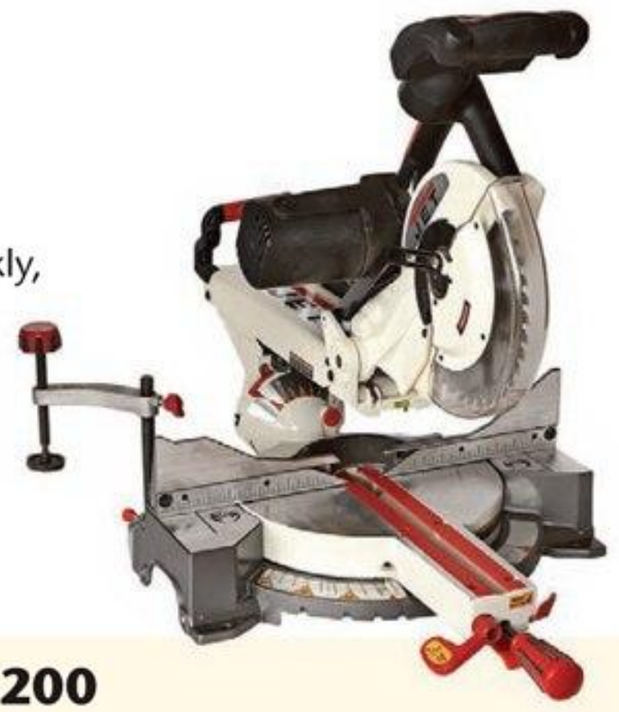
**800-706-7337, hitachipowertools.com**

**+ Hits:** One of only two tested models with a soft-start motor, it does not "kick" at start-up and shutdown. It's the only saw in the test to identify angle settings for crown molding with a 45° spring angle, and it still has the traditional crown-molding stops. Blade changes were easiest on this unit because the blade guard locks out of the way and the arbor locks in place. It comes with a 5-year warranty.

**– Misses:** Table pivoting felt stiffer than most when changing miter settings. This model's vertical handle was less comfortable in our hands than a horizontal handle. There's no onboard storage for the blade-changing tool and it lacks table extensions.

## Jet JMS-10SCMS, $460

**800-274-6848, jettools.com**



**+ Hits:** Color-coded miter-scale markings help locate the most-used angles quickly, and it has a 60° miter detent on the right. We like its front-mounted bevel lock for easy access and its green laser for high visibility.

**– Misses:** Wide cutouts in the fence allow tall workpieces to tip backward when cutting. Without a detent override, its lever-type miter lock doesn't hold securely on the cusp of a miter detent. We found the plunge and slide actions, as well as the table pivot, stiff. It does not include table extensions.

## Kobalt SM2505LW, $200

**800-445-6937, kobalttools.com**

**+ Hits:** It has the best fence among the $200 test models. Color-coded markings help to locate the most-used miter angles quickly. Built-in table extensions add 8" of support to each side with cutoff stops.

**– Misses:** It bogged down slightly when cutting thick hardwoods, requiring a slower feed rate, and the sliding action and table pivot felt stiffer than most. This saw bevels only to the left, and the blade guard gets in the way when making 45° beveled cuts. Dust kept building up on the rear-mounted laser, lessening its usefulness. Activating the safety switch and trigger simultaneously proved awkward. We'd like to have a place on the saw to store the blade-changing tool.

## Slide your mitersaw dollars to these models

By the end of our testing, two dual-bevel saws had risen to the head of this class: the Bosch 4410 and the Makita LS1016L. Both models provide test-leading miter ranges from 60° right to 52° left with rock-solid detents. The Bosch has nine miter detents and five bevel stops. We like its microadjuster for fine-tuning miter angles and its included table extensions for extra support.

But the Makita edges past the Bosch with a soft-start motor and more miter detents (10) and bevel stops (7). It also has the smoothest sliding and plunging action in the test, the tallest fence (by ½"), and the only factory-supplied blade capable of making furniture-quality cuts. For all this, the LS1016L earns our Top Tool honor.

If you'd like to get a slider but can't spring for the Makita, consider Craftsman's 21237 for just $250, our Top Value. This saw has few amenities, but it's accurate when set up correctly, and, although slightly underpowered, it cuts acceptably with a slower feed rate.

Produced by **Bob Hunter** with **Jeff Hall**

## MORE RESOURCES

- For a free video on techniques and tips for using a mitersaw, go to woodmagazine.com/mitersawvideo.
- For a review of 12" nonsliding compound mitersaws, go to woodmagazine.com/12mitersaw. $

## 10" SLIDING COMPOUND MITERSAWS:

| BRAND | MODEL | LASER TYPE (1) | MITER | | | | BEVEL | | DIMENSIONS | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | RANGE (LEFT, RIGHT), DEGREES | LEFT-SIDE DETENTS, DEGREES (ALL HAVE 0, 15, 22.5, 45) | RIGHT-SIDE DETENTS, DEGREES (ALL HAVE 0, 15, 22.5, 45) | DETENT OVERRIDE? (YES, NO) | RANGE (LEFT, RIGHT), DEGREES (2) | STOPS, DEGREES (ALL HAVE 0, 45) | FOOTPRINT WITHOUT EXTENSIONS, INCHES (W×D) (3) | WIDTH, INCLUDING EXTENSIONS, INCHES |
| BOSCH | 4405 | N* | 52, 60 | 31.6 | 31.6, 60 | Y | 45* | 33.9 | 43½ × 43 | 36 |
| | 4410 | N* | 52, 60 | 31.6 | 31.6, 60 | Y | 45, 45 | 33.9 | 43½ × 44 | 37½ |
| CRAFTSMAN | 21237 | R | 50, 50 | 31.6 | 31.6 | N | 45* | 33.9 | 36¼ × 40 | 38 |
| | 21201 | W | 47, 47 | 31.6 | 31.6 | Y | 47, 47 | 33.9 | 36½ × 42½ | 45½ |
| DEWALT | DW717 | N# | 60, 52 | 31.6, 60 | 31.6 | Y | 48, 48 | 22.5, 33.9 | 35 × 38 | 21¾ |
| HITACHI | C10FSH | T | 45, 57 | 31.6 | 31.6 | N | 45, 45 | 33.9 | 36½ × 41 | 20¾ |
| JET | JMS-10SCMS | R | 45, 60 | 31.6 | 31.6, 60 | N | 45, 45 | 33.9 | 41 × 42 | 21 |
| KOBALT | SM2505LW | R | 50, 50 | 31.6 | 31.6 | N | 45* | 33.9 | 35 × 39 | 41½ |
| MAKITA | LS1016L | T | 52, 60 | 31.6 | 31.6, 60 | N | 45, 45 | 22.5, 33.9 | 32½ × 35½ | 24 |
| RYOBI | TSS100L | R | 46, 50 | 30 | 30 | N | 45* | None | 41½ × 42 | 41 |

**NOTES**

1. (R) Rear-mounted single laser
   (T) Top-mounted single laser
   (W) Washer-mounted laser
   (N) No laser
   (*) Optional washer-mounted laser
   (#) Optional top-mounted laser
2. (*) Single-bevel saws tilt only to the left.
3. Measured as space required to allow full range of miter, bevel, and slide motions

## Makita LS1016L, $500

**800-462-5482; makitatools.com**

**+ Hits:** This saw "kicked" the least at start-up and shutdown thanks to its soft-start, angle-gear-driven motor. Besides offering the greatest miter range (60° left, 52° right) with 10 detents and an easy-to-read scale, the LS1016L provides seven bevel stops and twin bevel scales that read from either side of the saw. Two sets of rails make for the smoothest sliding and plunging action in the test. We also like its quick-positioning, two-stage workpiece clamp. Requiring the smallest footprint in the test, this saw proved easy to carry by its top handle despite weighing 56 pounds.

**– Miss:** Table-extension wings would be helpful, but you have to buy those separately ($15 apiece).

## Ryobi TSS100L, $200

**800-525-2579, ryobitools.com**

**+ Hit:** Extension wings add 10" of workpiece support left and right.

**– Misses:** The miter detents on this saw felt the least positive in the test: A small bearing drops into shallow cutouts. It's the only test saw without crown-molding detents, and its short left-side fence allows tall workpieces to tip backward when cutting. This saw bevels only to the left, and the blade guard gets in the way when making 45° beveled cuts. The guard does not lock out of the way for blade changes, you cannot adjust the throat-plate kerf opening, and there's no onboard storage for the blade-changing tool.

# ALL MAKE THE CUT, SOME BETTER THAN OTHERS

| | CUTTING CAPACITIES, INCHES | | | | | | PERFORMANCE RATINGS (4) | | | | | | | | | | | | | | | | ACCESSORIES (5) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MAX. WIDTH | | | | MAX.HEIGHT | | MITER | | | | BEVEL | | | | | | | | | | | | | | | | | | |
| | AT 0° MITER, 0° BEVEL | AT 45° MITER, 0° BEVEL | AT 0° MITER, 45° BEVEL | AT 45° MITER, 45° BEVEL | VERTICAL AT FENCE (¾" STOCK) | DIRECTLY BELOW ARBOR | ACCURACY OF STOPS | EASE OF CHANGING POSITION | RELIABILITY OF LOCK | SCALE READABILITY | ACCURACY OF STOPS | EASE OF CHANGING POSITION | RELIABILITY OF LOCK | SCALE READABILITY | OBSERVED POWER | EASE OF PLUNGE AND SLIDE | ABSENCE OF DEFLECTION | PORTABILITY | EASE OF USING HANDLE AND POWER SWITCH | EFFECTIVENESS OF FENCE | QUALITY OF FACTORY BLADE | EASE OF CHANGING BLADE | EFFECTIVENESS OF BLADE GUARD | EFFECTIVENESS OF LASER | DUST COLLECTION, AS EQUIPPED | STANDARD | OPTIONAL | CORD LENGTH, FEET–INCHES | WEIGHT, POUNDS | WARRANTY, YEARS | COUNTRY OF ASSEMBLY (6) | SELLING PRICE (7) |
| | 12¼ | 8⅝ | 12¼ | 8⅝ | 3⅝ | 3⅝ | A | A- | A | B | A | A | A | A- | A | A- | A- | B | A | B+ | B+ | A- | A | NA | C- | C, D, W | H, P, R, S | 4'6" | 57 | 1 | C | $425 |
| | 12⅛ | 8⅝ | 12⅛ | 8¾ | 3¾ | 3⅝ | A | A | A | B | A | A | A | A | A | A- | A | B- | A | A- | B+ | B+ | B+ | NA | C- | C, D, S, T | H, P, R | 8'6" | 62 | 1 | T | 550 |
| | 12½ | 9 | 12⅝ | 9¼ | 3⅝ | 3⁹⁄₁₆ | A | A | A | A- | A | B | A | B- | B+ | A- | A- | B- | B+ | B | B- | B- | C | B- | B | C, D, S, T | P | 4'6" | 40 | 1 | C | 250 |
| | 12⅛ | 8⅝ | 11¾ | 8¾ | 4 | 3⁹⁄₁₆ | A | B | A | A | A- | B | A- | B+ | A | B | A- | B- | B- | A- | B- | A- | A | C | B | D, H, R, S, W | P | 6' | 53 | 1 | T | 450 |
| | 12⅝ | 8⅞ | 12⅝ | 9 | 6 | 3⁹⁄₁₆ | A | A- | A | A- | A | A | A | A- | B+ | A | A | B | B | A | B | B+ | C | NA | B | C, D | L, P, R, S, W | 6' | 51 | 3 | M | 500 |
| | 12¼ | 8⁵⁄₈₁₆₆ | 12 | 8½ | 3½ | 3⁹⁄₁₆ | A | B | A | A- | A | B | A | A- | A | A- | A | A- | B | B | B+ | A | A | A- | B+ | C, D | P, R, S, W | 6' | 43 | 5 | J | 450 |
| | 12¼ | 8⅝ | 12⅛ | 8½ | 4⅛ | 3⅝ | A | B | B | B | A | A | A | A | A | B | A- | B+ | B | D | C | B- | A | B+ | B- | C, D | W | 7'6" | 50 | 3 | T | 460 |
| | 12 | 8½ | 12 | 8¾ | 3¾ | 3⅝ | A | B | A | A- | A | B | A | B- | B+ | B+ | B+ | B+ | C | A- | C | B- | C | B- | B- | C, D, S, T | | 6'6" | 40 | 3 | C | 200 |
| | 12⅛ | 8⅝ | 12 | 8½ | 5¼ | 3¹¹⁄₁₆ | A | A- | A | A- | A | B+ | A | A | A | A | A- | A- | A- | A | A- | A- | A | A- | B+ | C, D | H, P, R, W | 7' | 56 | 1 | U | 500* |
| | 12½ | 8⅞ | 12⅝ | 9 | 3½ | 3½ | B | B | A- | B | A- | B | A- | D | A | B+ | B+ | B | B | C- | D+ | B- | C | B- | C- | C, D, W | P | 6'6" | 43 | 2 | C | 200 |

4. A Excellent; B Good; C Fair; D Poor; NA Not Applicable

5. (C) Hold-down clamp; (D) Dust bag; (H) Horizontal clamp; (L) LED lamp; (P) Portable stand; (R) Crown-molding stops; (S) Cutoff stop; (T) Table extensions; (W) Extension wings

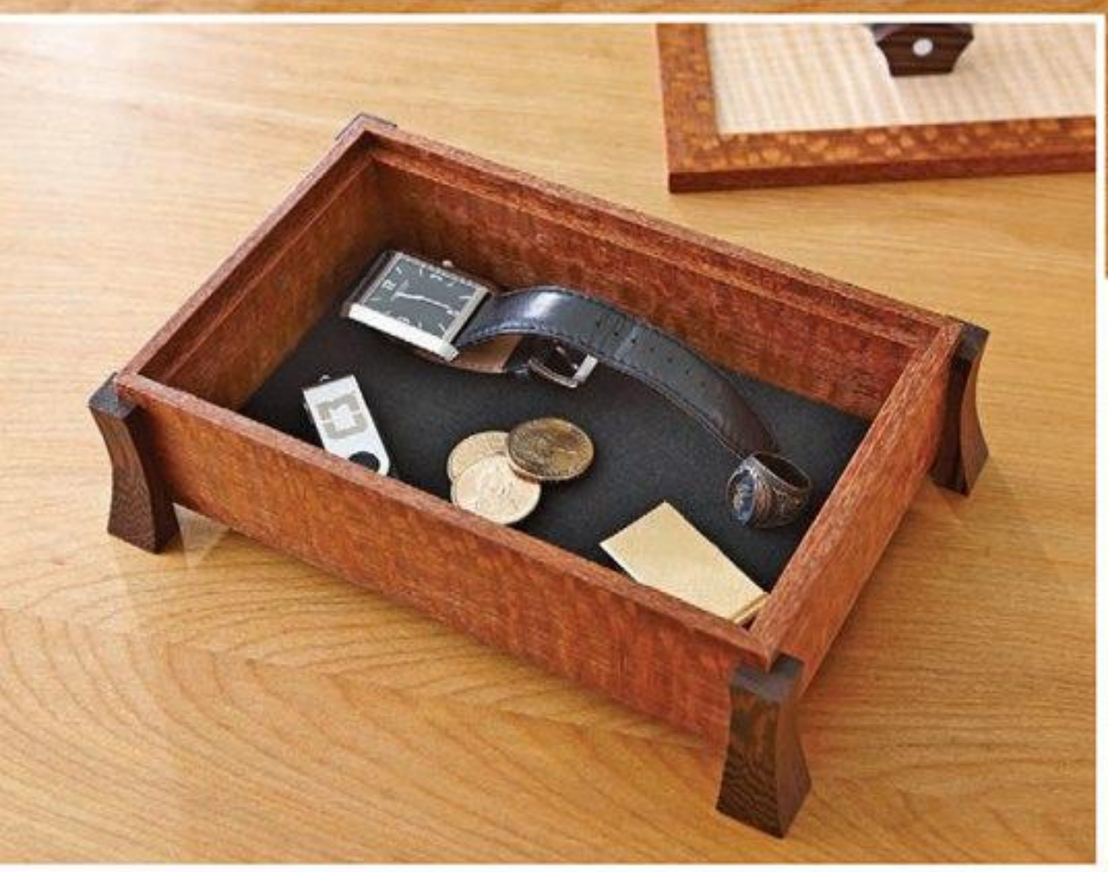
6. (C) China; (J) Japan; (M) Mexico; (T) Taiwan; (U) United States

7. Prices current at time of article production and do not include shipping, where applicable. (*) Available without laser for $450

Just in time for holiday giving

# Keepsake Box

Dimensions: 8⅞" wide × 5⅞" deep × 3⅞" high



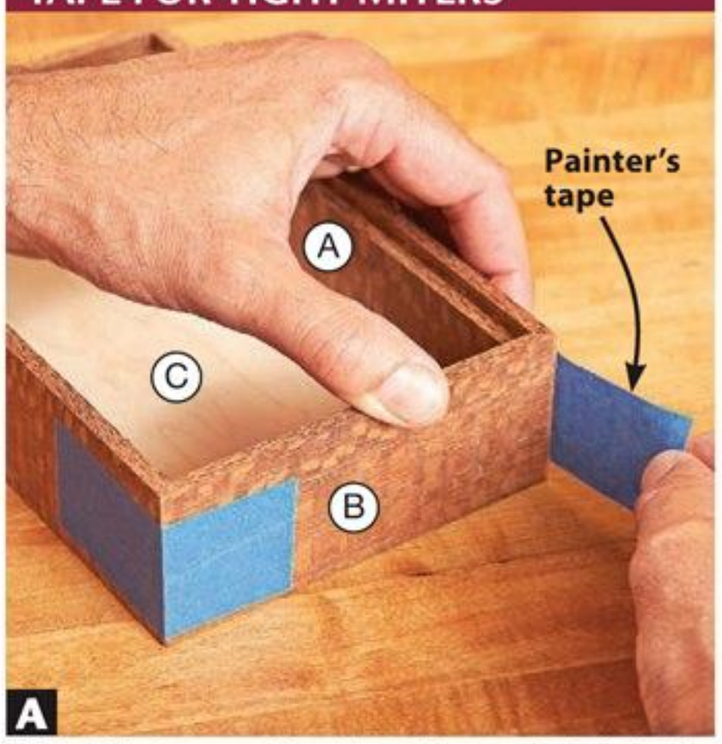
Three species of wood—and a bit of aluminum—give this little project lots of visual appeal. (And don't worry about working with aluminum—you already have everything you need to cut and shape it.) The rabbeted legs lift the box and wrap around each corner to conceal any less-than-perfect miter joints, while under the lid, items rest softly on a felt-padded bottom. For additional design options for this box and others, see *page 66*.

## Build the box

**1** Prepare a ⅜×4×30" blank. (We used lacewood.) Rip a 2"-wide strip from one edge for the box sides (A) and box ends (B). Save the offcut for the lid ends (F) and lid sides (G).

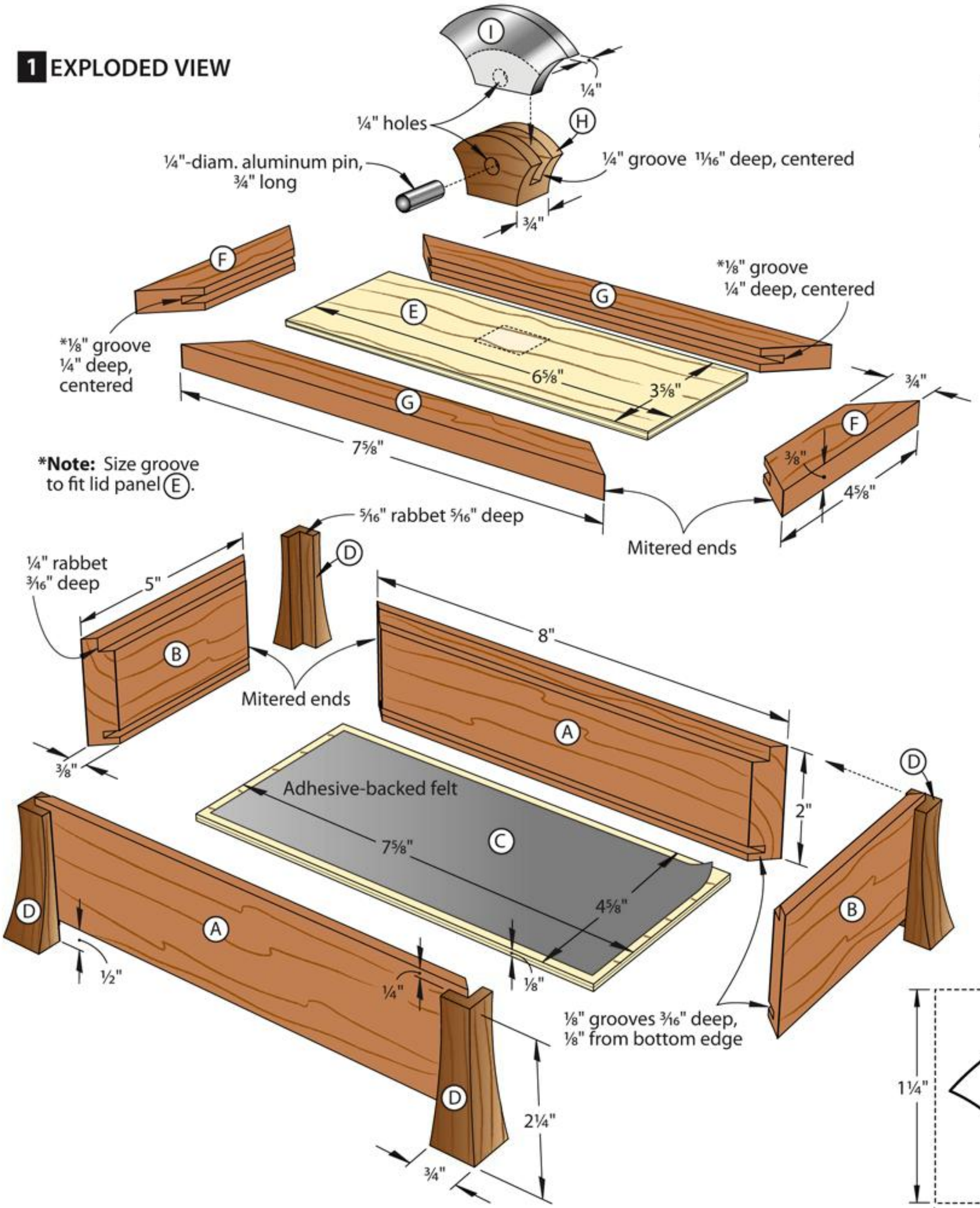
**2** In your tablesaw, set up a ¼" dado blade and raise it 3/16" above the table. Attach an auxiliary fence to the rip fence and cut a ¼" rabbet for the lid along the

### TAPE FOR TIGHT MITERS

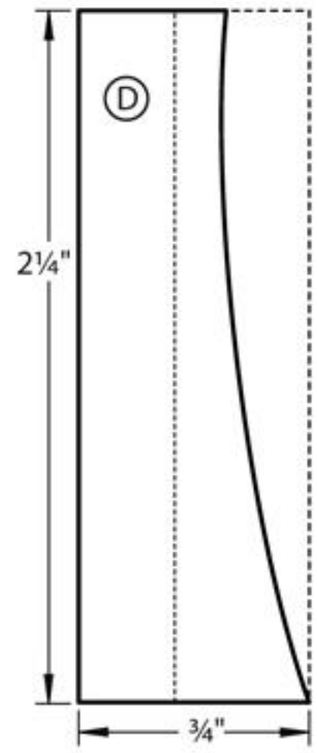



**Miter joints can slip when clamped. Painter's tape stretched taut around each corner holds the joints closed while the glue dries.**

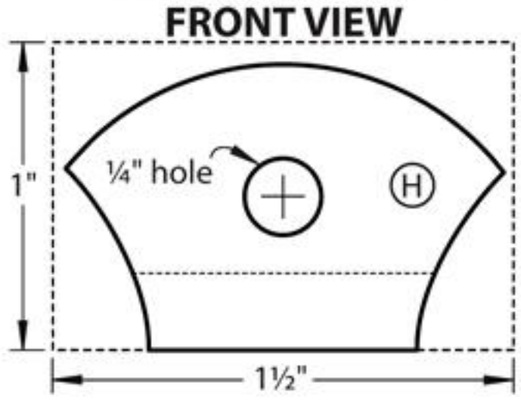
**1** EXPLODED VIEW



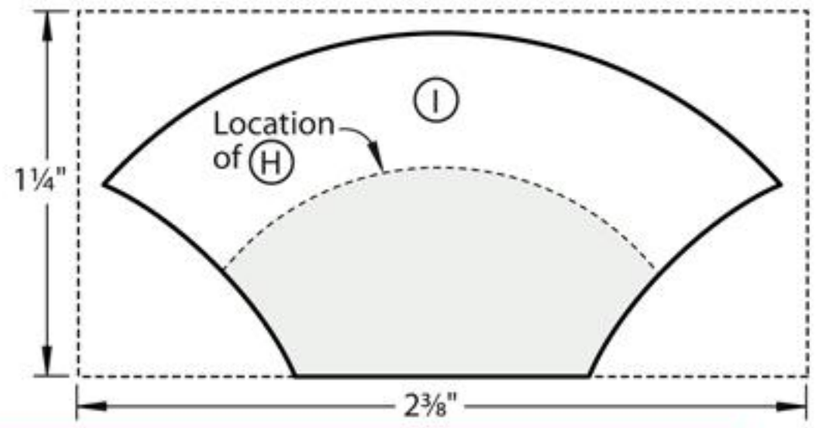

**FOOT FULL-SIZE PATTERN SIDE VIEW**




**HANDLE BASE FULL-SIZE PATTERN FRONT VIEW**




**HANDLE FULL-SIZE PATTERN FRONT VIEW**




top edge of the blank [**Drawing 1**]. Switch to a combination blade and cut the groove for the bottom (C). Bevel-cut the blank in half [**Shop Tip**]; then bevel-cut a box side (A) and box end (B) from each half. Sand the inside faces to 220 grit.

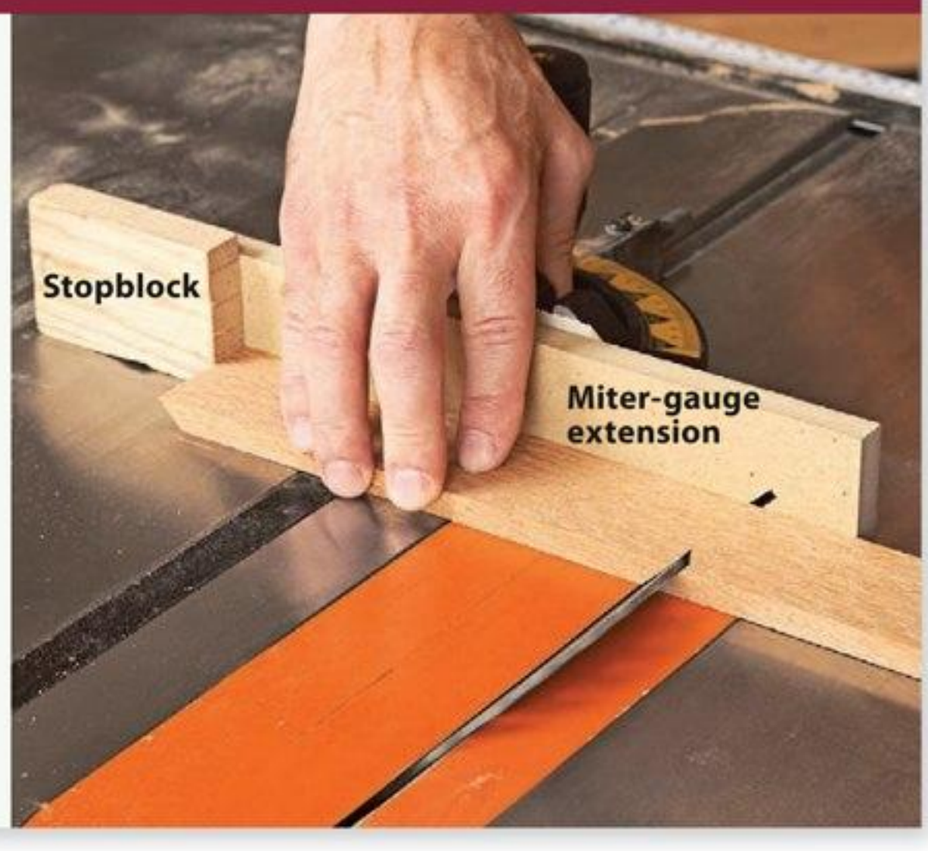
**3** Dry-fit the box sides (A) and ends (B) and measure for the bottom (C). Cut the bottom to size from ⅛" plywood [**Drawing 1**]. Assemble the box, gluing the bottom into the grooves [**Photo A**].

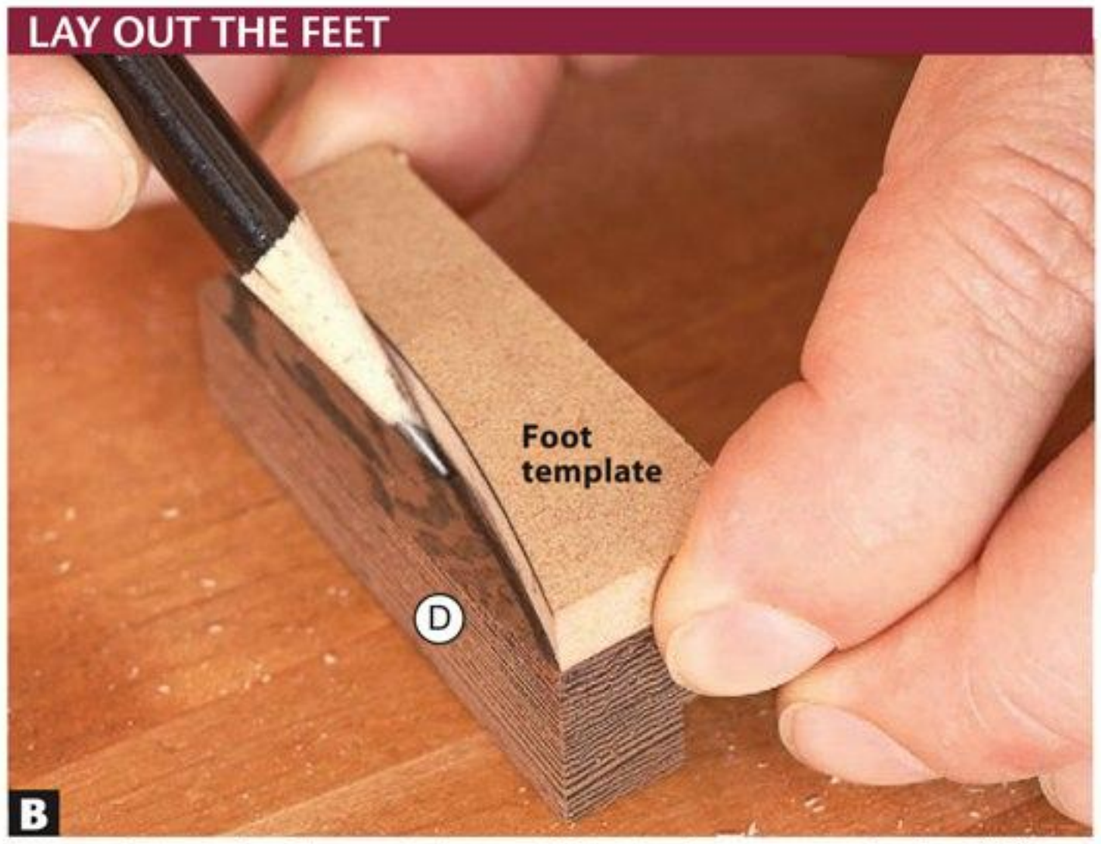
**4** On one edge of a ¾×¾×12" wenge blank, rout or cut a 5⁄16" rabbet 5⁄16" deep. Crosscut the feet (D) to length from this blank [**Drawing 1**]. Make a copy of the **Foot Pattern**, *above right*, and spray-adhere it to a piece of ¼" hardboard or plywood. Bandsaw and sand the hardboard to the pattern lines, then use this

## SHOP TIP

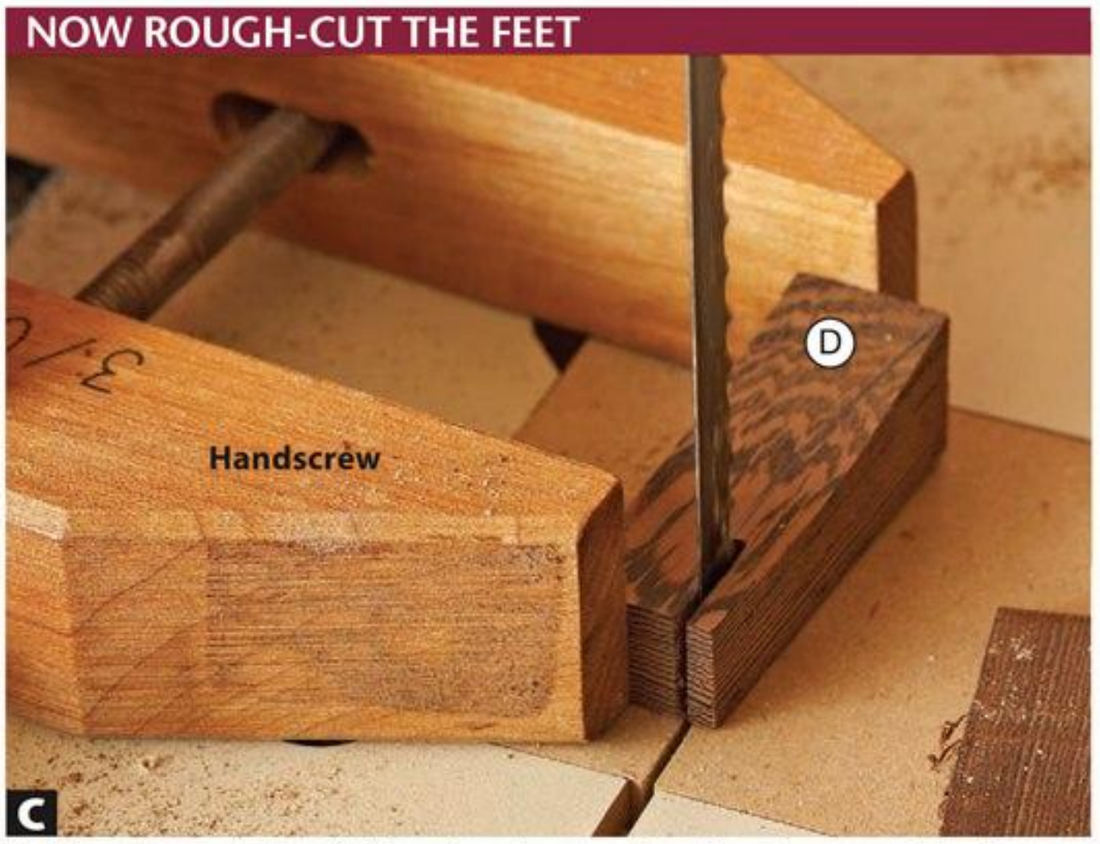
### Spot-on miters and bevels

Before bevel-cutting or mitering project parts, check the accuracy of your blade or miter-gauge setup by cutting a test box or frame to ensure that all four corners come together with no gaps. A miter-gauge extension that reaches past the blade, *right*, backs up the cut to prevent chip-out. For identical-length pieces, fasten a stopblock to the extension using double-faced tape.

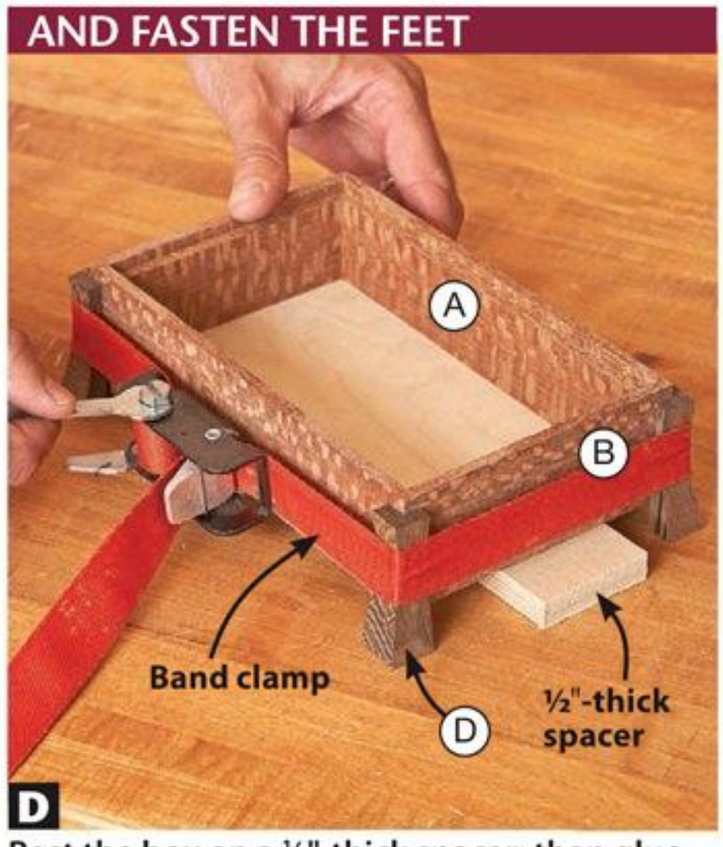




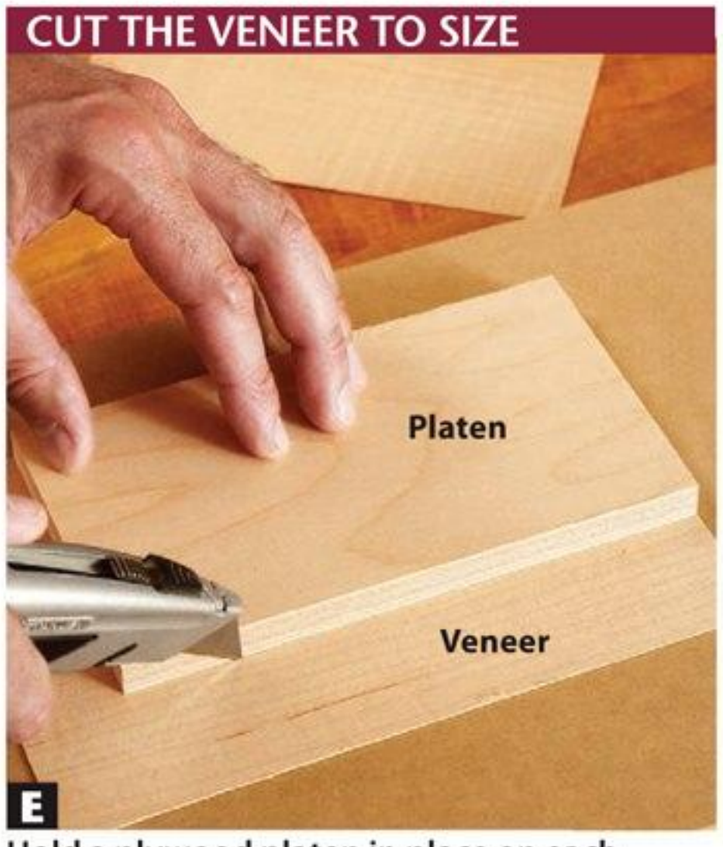

A template makes it easy to lay out identical curves on the feet (D). Align the bottom of the template with the end of the foot.



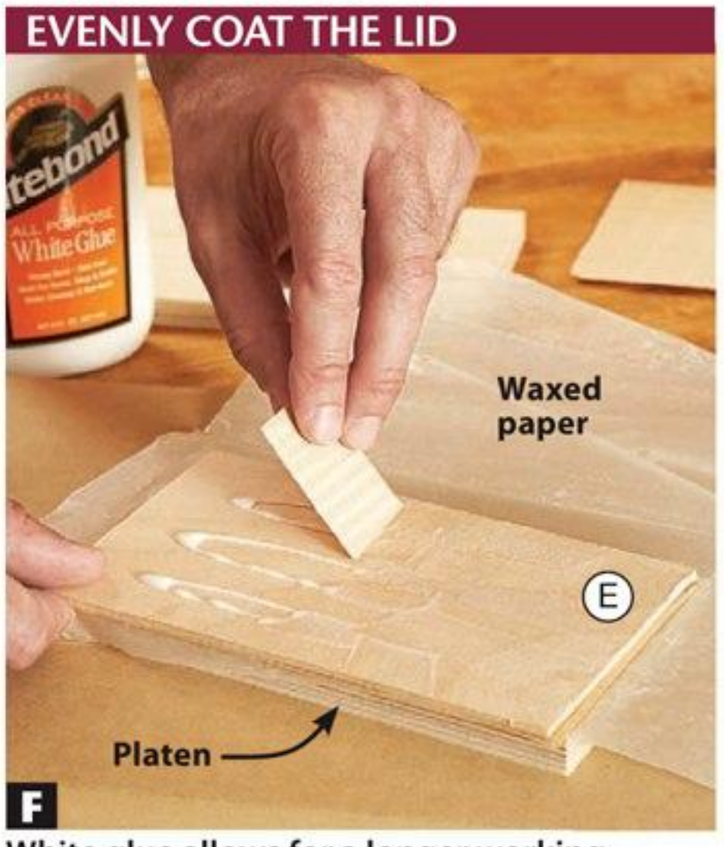

Safely grip each foot (D) in a handscrew. Bandsaw just outside the line; then lay out the curve on the adjacent face.




Rest the box on a ½"-thick spacer; then glue and band-clamp the feet (D) to the corners. Make sure each foot rests on the bench.




Hold a plywood platen in place on each piece of veneer and, using a fresh blade, cut around the platen.




White glue allows for a longer working time. Spread an even coat, then position the veneer flush with the platen edges.

template to transfer the foot shape to one unrabbeted face of each foot [**Photo B**]. Bandsaw this face to within 1/16" of the line [**Photo C**], then lay out the profile on the adjacent unrabbeted face and cut it close to the line. With 220-grit sandpaper, finish-sand the feet to final shape; then assemble the box [**Photo D**].

## Let's look at the lid

**1** Cut a 4×7" blank for the lid panel (E) from ⅛" plywood [**Drawing 1**]. From ½" plywood, cut two 4×7" platens to use when gluing veneer to the lid panel. Using a platen as a template, cut the veneer to size [**Photo E**]. (We chose quilted maple.)

**2** Spread an even coat of white glue on one face of the lid blank [**Photo F**] and position it on a veneer sheet. Place the blank veneer side down on a waxed-paper-covered platen. Apply glue to the exposed lid face and position the second piece of veneer. Clamp up the platens and lid [**Photo G**]. Allow the glue to dry at least four hours before removing the clamps and platens.

**3** Trim the lid panel (E) to finished size [**Drawing 1**] and finish-sand it to 220 grit. Retrieve the blank for the lid ends (F) and lid sides (G) and rip it to ¾" wide. Cut a centered groove along one edge of the blank to match the thickness of the lid panel. Miter-cut the ends and sides from the blank to fit around the lid panel [**Photo H**].

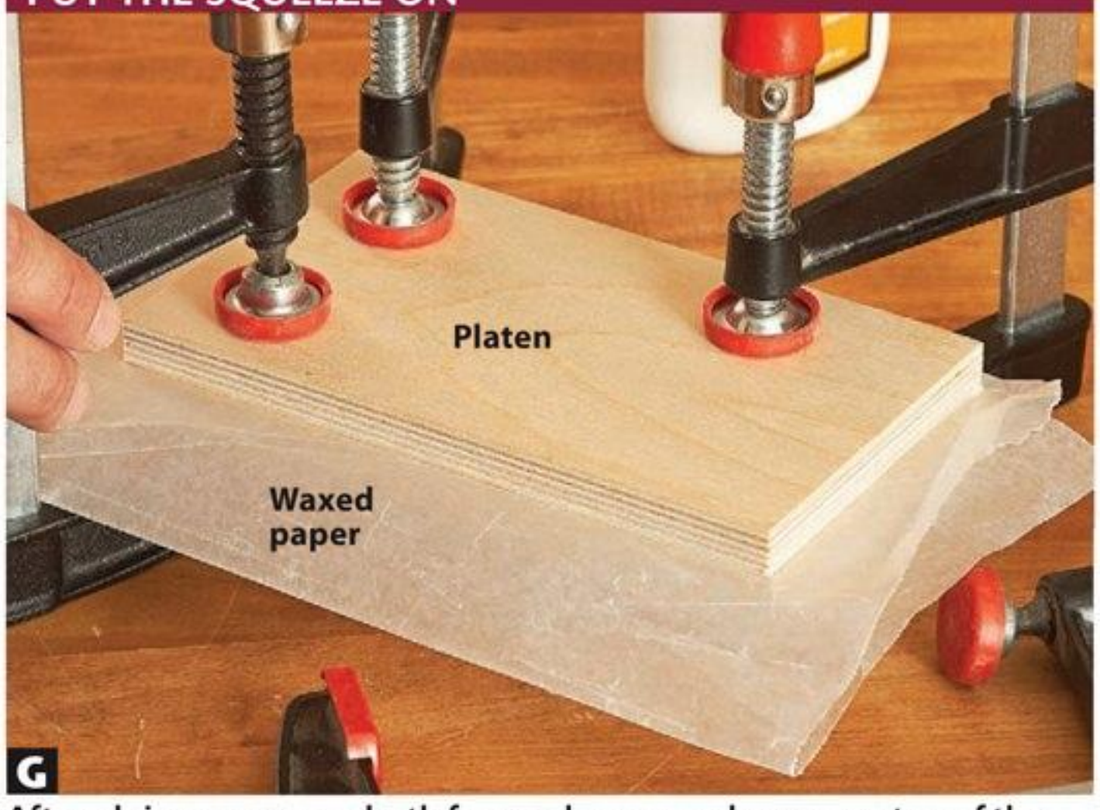
**4** Apply glue to the miters and the grooves in the lid ends (F) and sides (G) and assemble the lid with the panel (E). Clamp the corners with painter's tape. After the glue dries, sand the lid so it fits easily in the rabbet in the top of the box (A–D). ***Quick Tip! Keep the lid uniform.*** Sand equally on opposite sides so matching pieces stay the same width.

## Handle this job easily

**1** From wenge, cut a ¾×1×12" blank for the handle base (H). Cut a ¼"-wide groove 11/16" deep, centered on the blank's thickness [**Drawing 1**]. Make a copy of the **Handle Base Pattern** on *page 63* and spray-adhere it to the blank, aligning the bottom of the pattern with the ungrooved edge of the blank. Bandsaw 1/16" outside the lines and finish-sand up to the top line only.

**2** Spray-adhere a copy of the **Handle Pattern** to a piece of ¼"-thick aluminum stock. ***Quick Tip! Wood is good, too.*** If you don't take a shine to metal, feel free to substitute lacewood or another species for the aluminum handle (I). Bandsaw just outside the pattern lines. Sand the top edge to 220 grit, then remove the pattern and sand the faces. We polished the aluminum starting with 150-grit sanding pads and finishing with 320 grit.

## PUT THE SQUEEZE ON

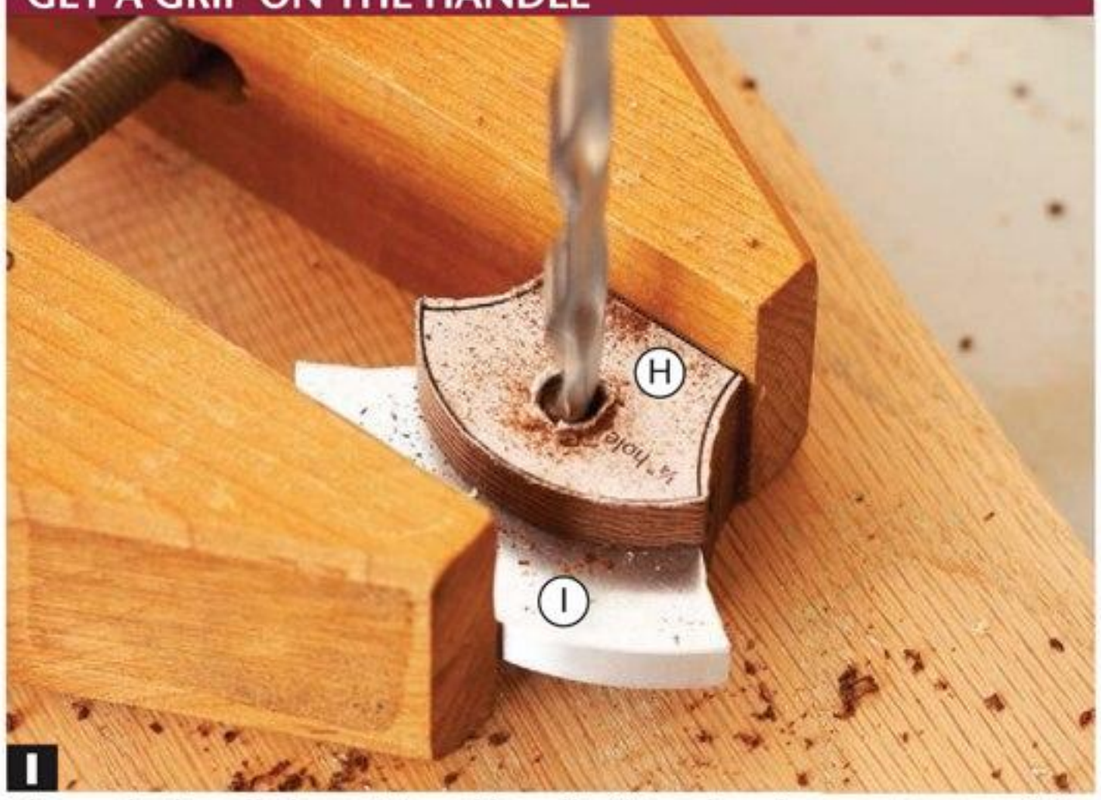



After gluing veneer on both faces, place waxed paper on top of the veneered panel, then clamp the top platen in place.

## USE A STOPBLOCK FOR IDENTICAL SIDES AND ENDS

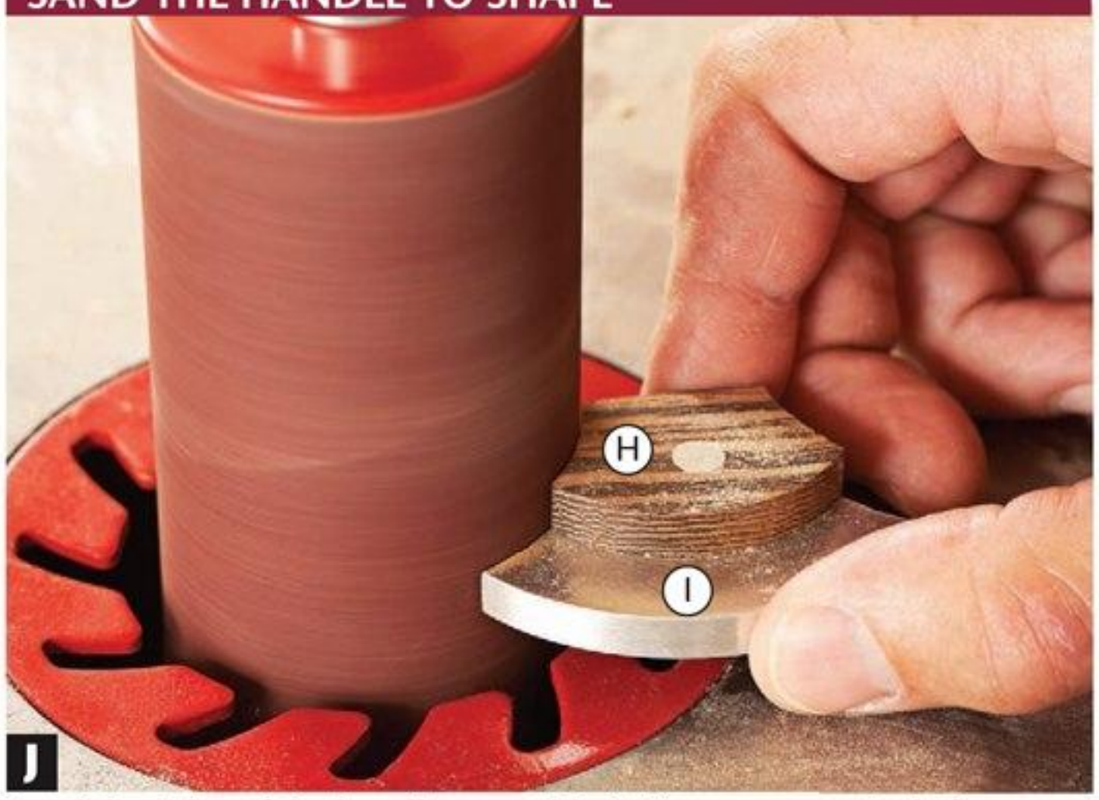
Position the miter-gauge head as shown so the workpiece presses against the stopblock throughout the cut.

## GET A GRIP ON THE HANDLE




Clamp the handle base (H) and handle (I) in a handscrew. Mount a ¼" twist bit in your drill press and bore through both pieces.

## SAND THE HANDLE TO SHAPE




Sand the sides of the handle assembly (H/I) on progressively finer sanding drums to achieve the sheen you desire on the metal.

**3** Center the handle (I) in the handle base (H), clamp the pieces in a handscrew [**Photo I**], and drill the hole where indicated. Cut a length of aluminum rod to fit in the hole and secure it with a dab of epoxy if needed. Sand the rod flush with both faces of the handle base.

**4** Using a 220-grit spindle sander or sanding drum mounted in your drill press, sand the handle assembly (H/I) until the aluminum is flush with the wood [**Photo J**]. Glue the handle base to the lid panel (E), centered.

## Finishing touches

**1** Apply a finish to the box and lid. To reach all the inside corners with even coverage, we sprayed on three coats of aerosol satin lacquer.

**2** Cut a piece of adhesive-backed felt (available at hobby shops and fabric stores) to fit in the bottom. Test the fit before peeling off the backing and pressing it in place.


Produced by **Craig Ruegsegger** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Lorna Johnson**

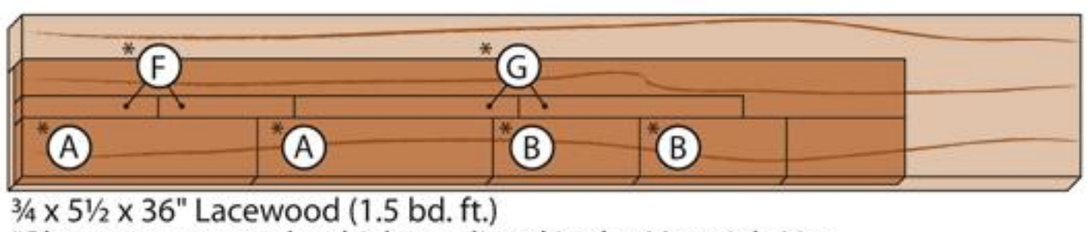

## Materials List

| Part | | FINISHED SIZE T | W | L | Matl. | Qty. |
|---|---|---|---|---|---|---|
| A* | sides | ⅜" | 2" | 8" | L | 2 |
| B* | ends | ⅜" | 2" | 5" | L | 2 |
| C | bottom | ⅛" | 4⅝" | 7⅝" | BP | 1 |
| D* | feet | ¾" | ¾" | 2¼" | W | 4 |
| **Lid** | | | | | | |
| E* | lid panel | ⅛" | 3⅝" | 6⅝" | VP | 1 |
| F* | lid ends | ⅜" | ¾" | 4⅝" | L | 2 |
| G* | lid sides | ⅜" | ¾" | 7⅝" | L | 2 |
| H* | handle base | ¾" | 15/16" | 1 7/16" | W | 1 |
| I* | handle | ¼" | 1⅛" | 2¼" | A | 1 |

*Parts initially cut oversize. See the instructions.

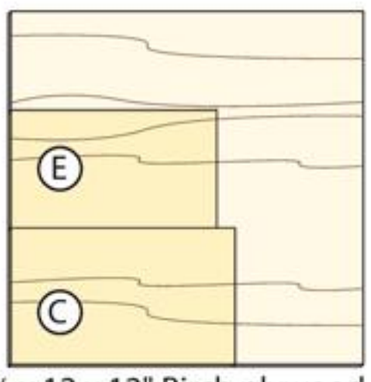
**Materials key:** L-lacewood, BP-birch plywood, W-wenge, VP-veneered birch plywood, A-aluminum.
**Supplies:** Spray adhesive, ¼×1½" aluminum bar, ¼"-diam. aluminum rod, quilted-maple veneer, 4¼×7¼" self-adhesive felt.
**Blade and bit:** Dado blade; ¼" drill bit.
**Materials kit:** Contains lumber, plywood, veneer, aluminum, and felt for one box, pieces cut slightly oversize. Kit no. W202, $43.00, Heritage Building Specialties, 800-524-4184, heritagewood.com.

## Cutting Diagram




¾ x 5½ x 36" Lacewood (1.5 bd. ft.)
*Plane or resaw to the thickness listed in the Materials List.

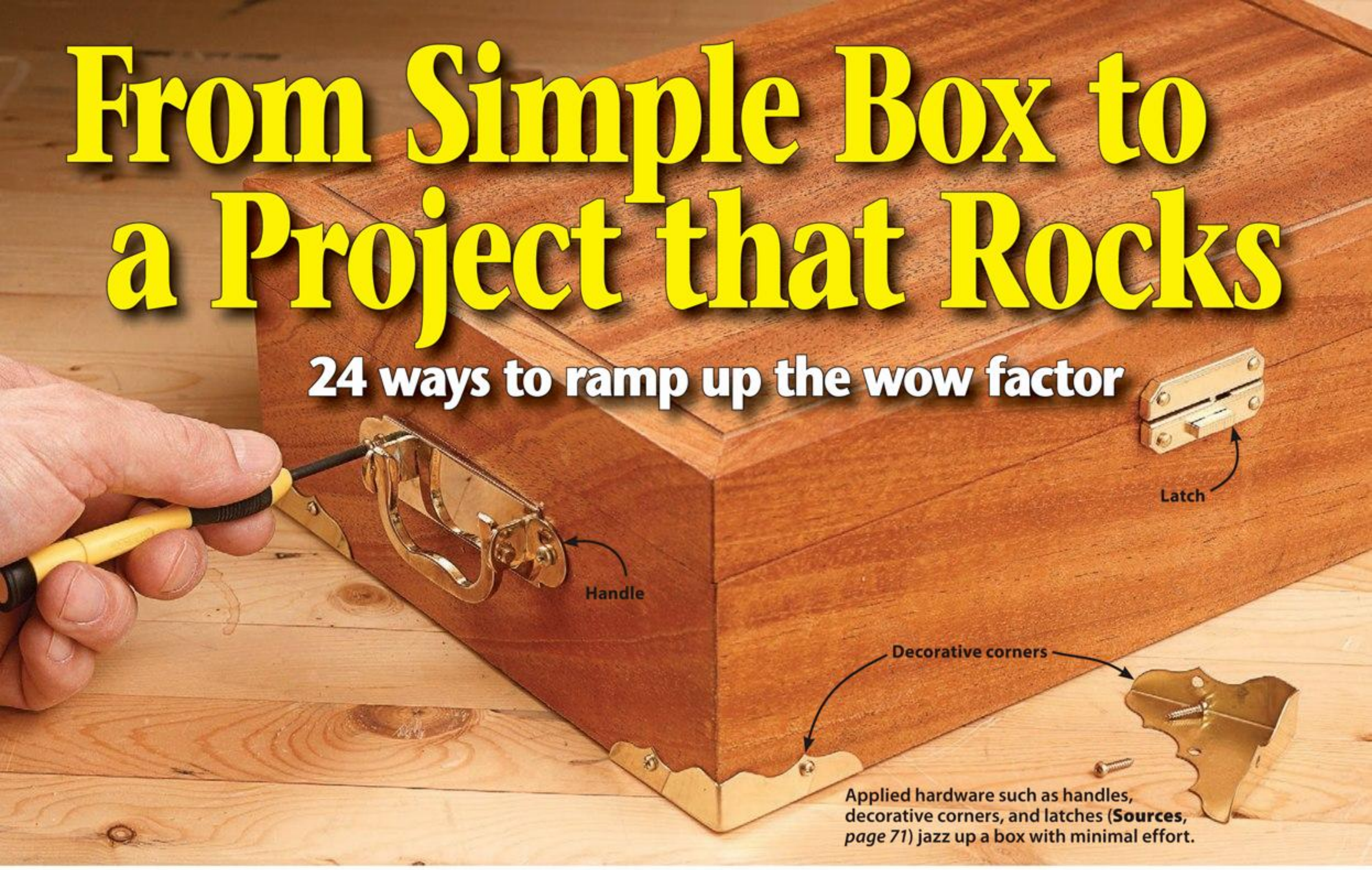
¾ x 1½ x 24" Wenge (.3 bd. ft.)




⅛ x 12 x 12" Birch plywood

# From Simple Box to a Project that Rocks

## 24 ways to ramp up the wow factor




Applied hardware such as handles, decorative corners, and latches (**Sources**, *page 71*) jazz up a box with minimal effort.

It's easy to see why small boxes are popular projects: They require little material and go together quickly, in even the smallest shop. Plus, you can stretch your creativity by customizing them. On the next few pages, we offer tips on giving your boxes that extra personality to set them apart.

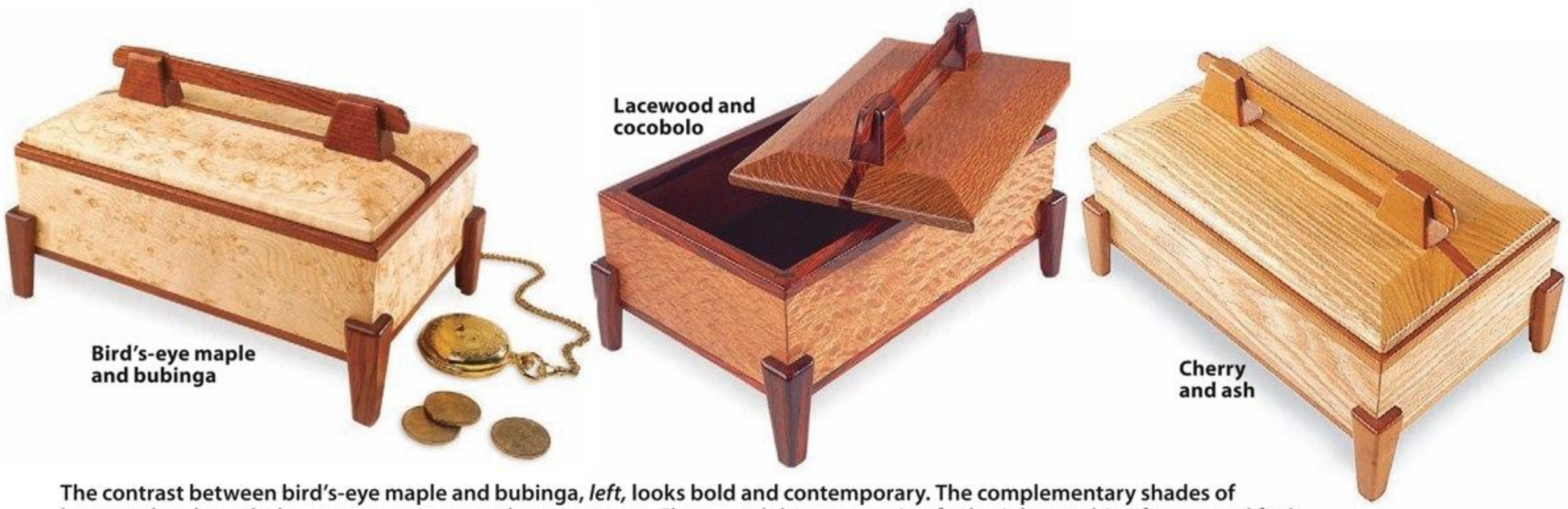
Find plans for each of the boxes featured in this article along with many more gift boxes and jewelry chests at woodmagazine.com/cmbox.

## Wow 'em with the wood

### Start with striking stock

Making a box provides a great opportunity to use exotic stock without spending an arm and a leg. The smaller scale also allows for bold choices in contrasting species and colors that might overwhelm a larger piece.

Although they're all built in the same way, each version of the keepsake box *below* makes a distinct impression on the eye. To find interesting color and grain combinations, create samples of various species by finish-sanding, staining, and finishing scraps. Then mix and match to find pairings you like.




**The contrast between bird's-eye maple and bubinga, *left*, looks bold and contemporary. The complementary shades of lacewood and cocobolo, *center*, create a stately appearance. Cherry and the open grain of ash, *right*, combine for a casual feel.**

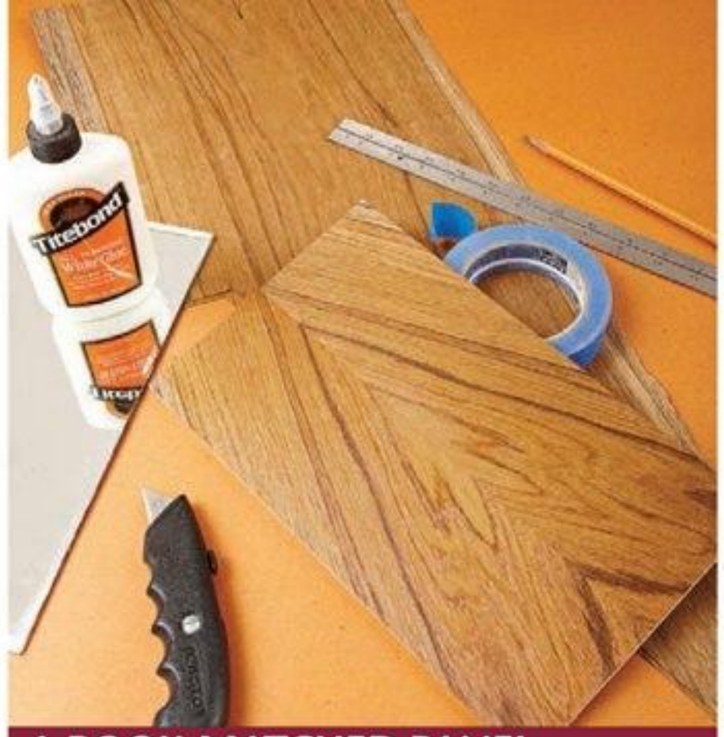
## Make it shine with symmetry

Book-matching creates a striking lid panel by mirroring the grain pattern across a joint line, as shown at *right*. The steps *below* demonstrate how to create a veneered book-match, but you'll get similar results using resawn solid wood.

First, stack two consecutively cut sheets of veneer [**Sources,** *page 71*], aligning their grain patterns. Tape them together to keep them from shifting; then find and mark the joint line, *below*.

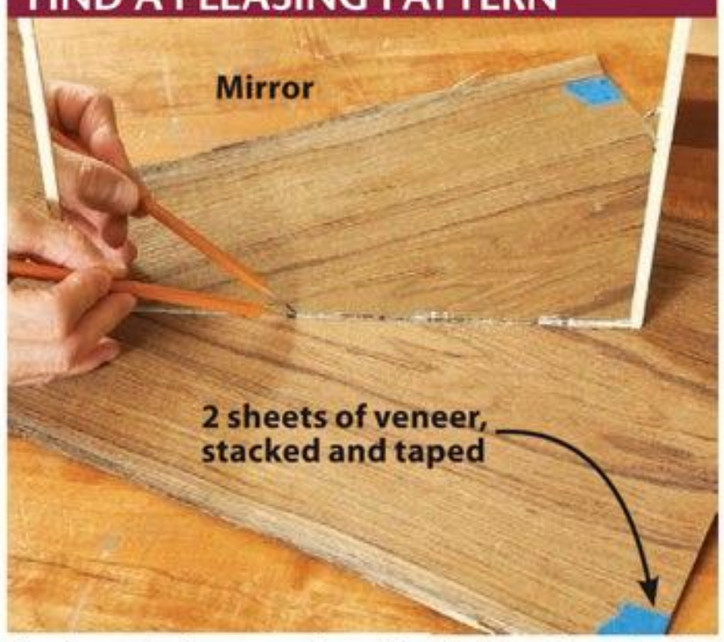
Place a metal straightedge along the mark and cut on the waste side with a fresh blade in a razor knife. To joint the just-cut edges, sandwich the veneer sheets between two pieces of MDF and sand them, *below*.

Remove the tape and open the veneer like the pages of a book. Align the grain pattern across the joint line and tape the pieces together, *below right*. Glue the veneer to the substrate using clamps and shop-made platens, as shown on *page 65*.



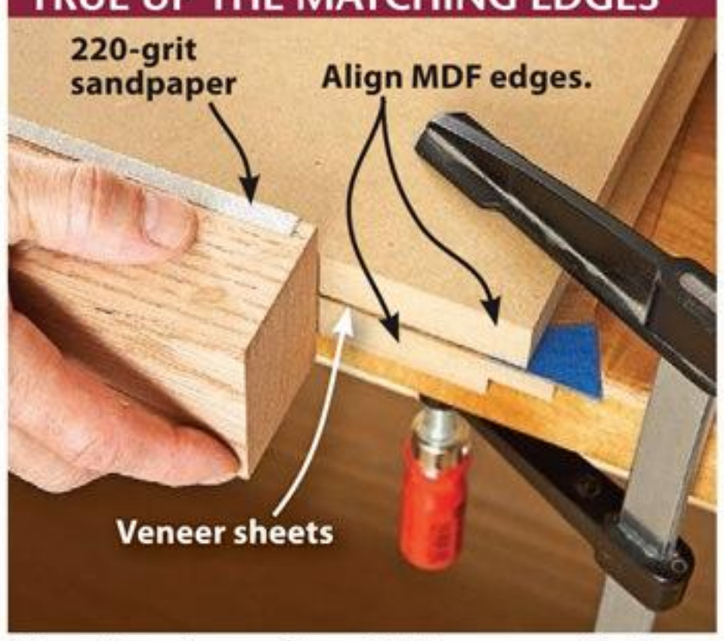
A BOOK-MATCHED PANEL

### FIND A PLEASING PATTERN



A mirror helps you visualize interesting book-matches. Find an eye-catching pattern; then mark along the mirror with a pencil.

### TRUE UP THE MATCHING EDGES



Align the edges of two MDF scraps with the cut edges of the veneer barely protruding. Sand the veneer flush with the MDF.

### SEAL THE SEAM

Painter's tape holds the joint together during glue-up. Clamp the substrate and veneer between ¾" MDF or plywood platens.

## Wrap grain around corners

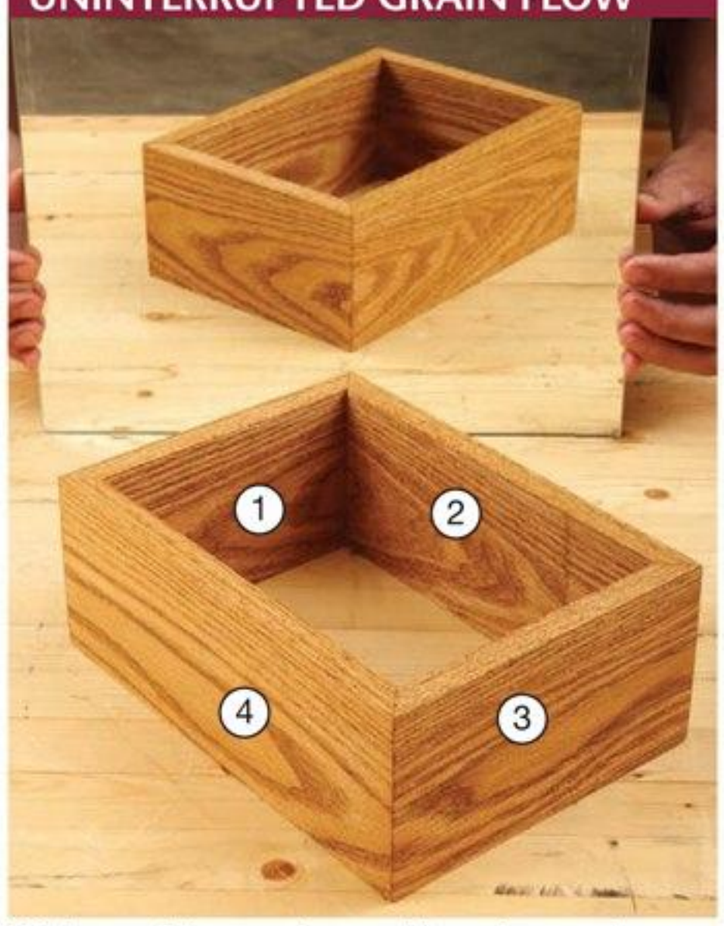
This technique makes the grain pattern continue around all four corners of a mitered box, as shown at *right*.

Start with stock that, when jointed and planed flat, is more than twice as thick as the finished thickness of the box sides. For example, for ½"-thick sides, use a piece of 1¼"-thick stock. Crosscut it ¼" longer than the combined length of a box side and end [**Drawing 1**].

Lay out your box pieces on the edge of the board, as shown. Resaw the board down its middle and joint the just-sawn faces flat. Plane the *opposite* faces to bring the boards to final thickness.

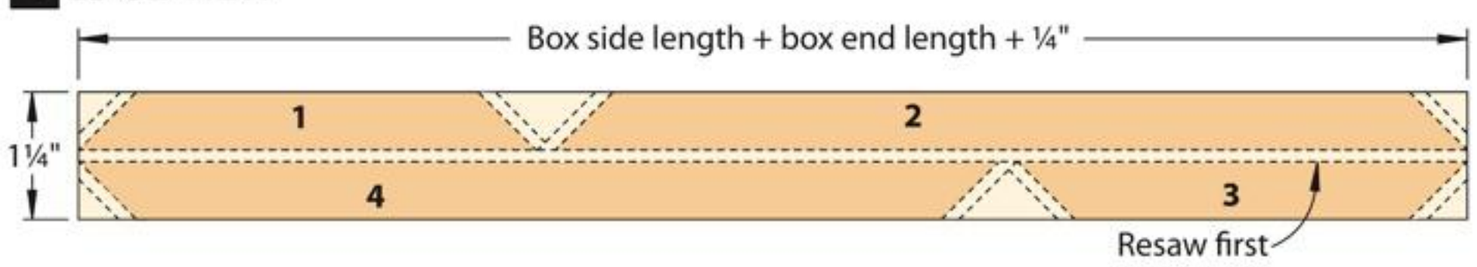
Next, bevel-cut each end of each board, removing as little length as possible [**Drawing 1**]. With a stopblock attached to a miter-gauge extension, bevel-cut the box ends (parts 1 and 3) to length [**Drawing 2**]. Then reset the stopblock to cut the sides (parts 2 and 4), again removing as little length as possible. Assemble the parts in numerical order, *right*.

### UNINTERRUPTED GRAIN FLOW

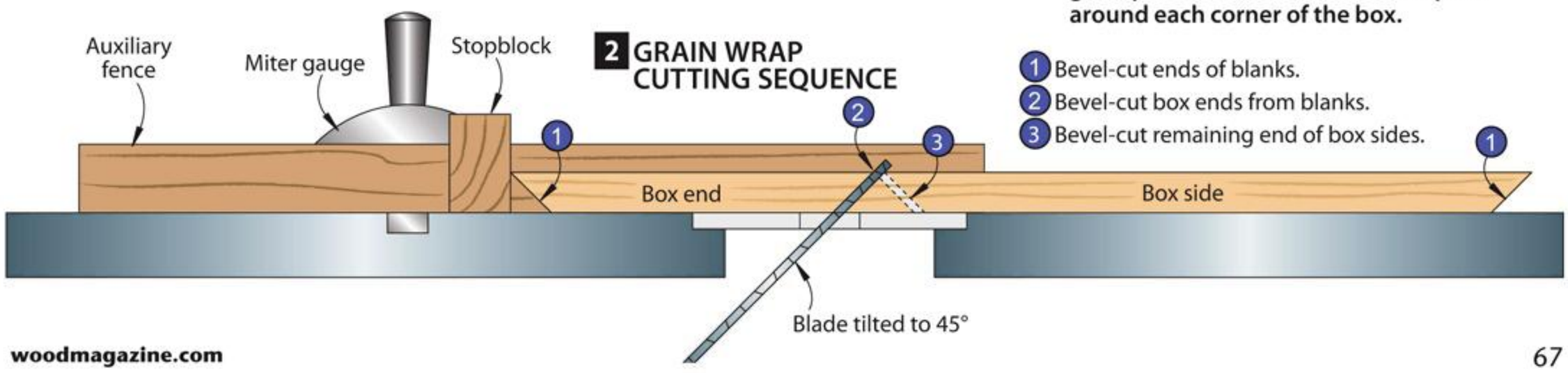


With careful resawing and bevel cuts, the grain pattern continues uninterrupted around each corner of the box.

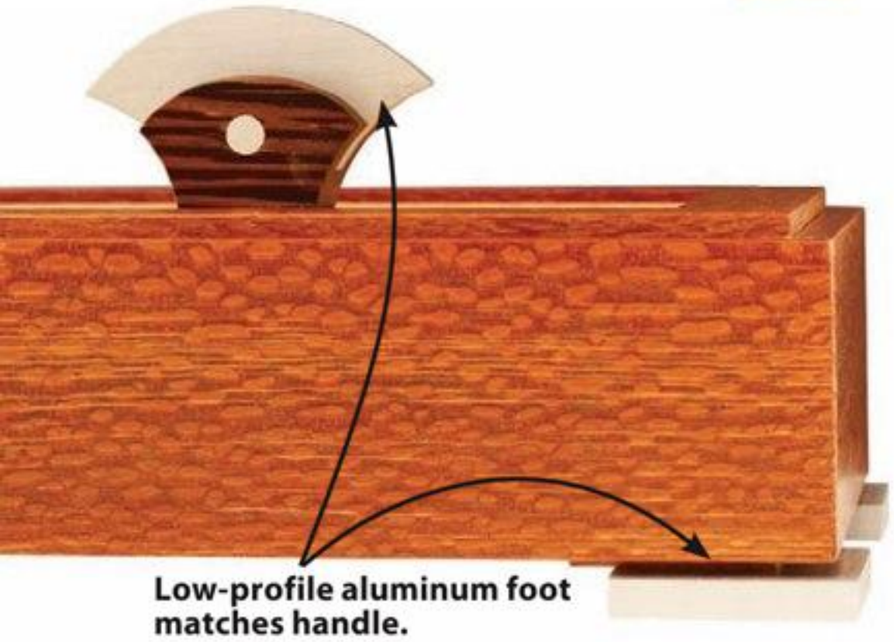
**1 EDGE VIEW**




**2 GRAIN WRAP CUTTING SEQUENCE**



# Give it a raise



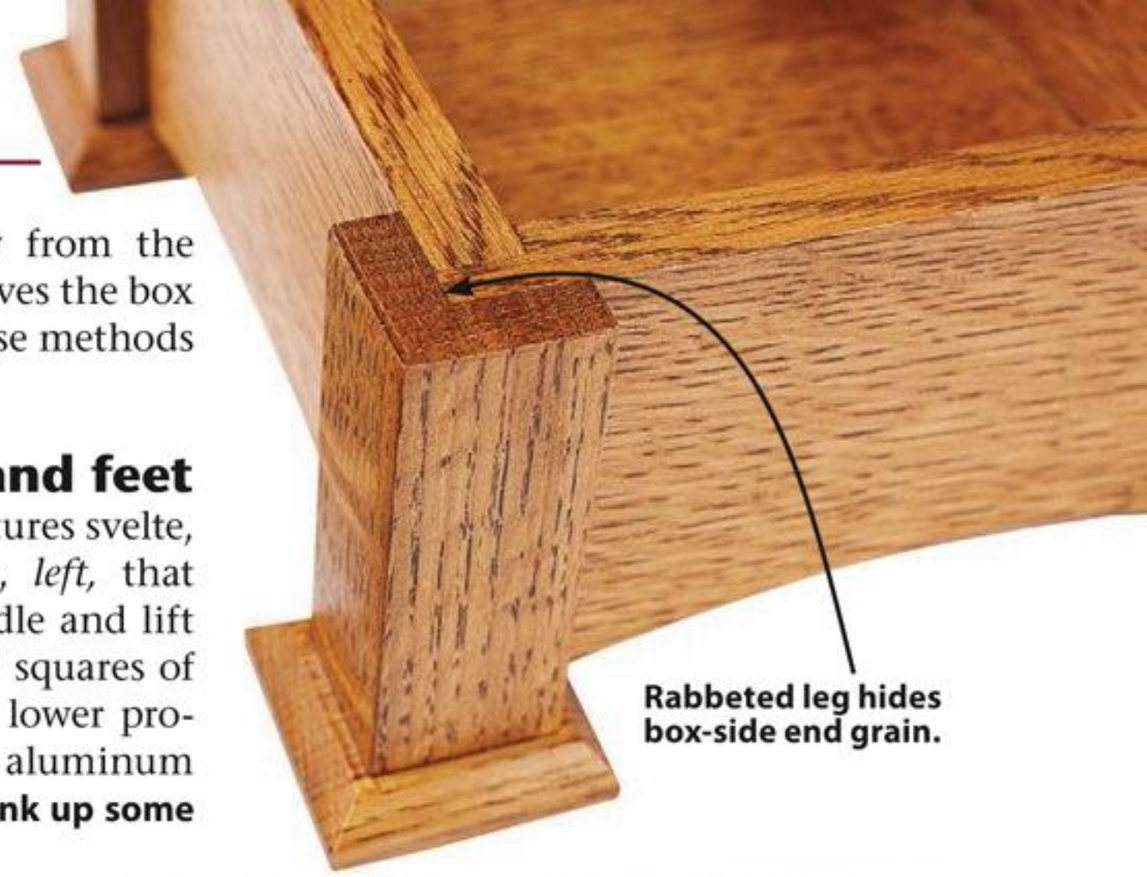

Separating a box slightly from the surface on which it sits gives the box a lighter appearance. Try these methods to add extra elevation.

## Lift with your legs and feet

The small box on *page 62* features svelte, curved legs at each corner, *left,* that match the wood in the handle and lift the box above the table. 1½" squares of ¼"-thick aluminum create a lower profile, *lower left,* and echo the aluminum used in the handle. (See **Crank up some metal** on the *next page*.)

Each leg of the small box, *upper left,* wraps around the corner. The rabbeted legs stop short of the top, creating a stairstep repeated by the raised lid. The box at *upper right* also uses a rabbeted leg, but here it runs the full height of the sides, hiding the end grain at the corner. This type of leg can hide an imperfect mitered corner joint, too.

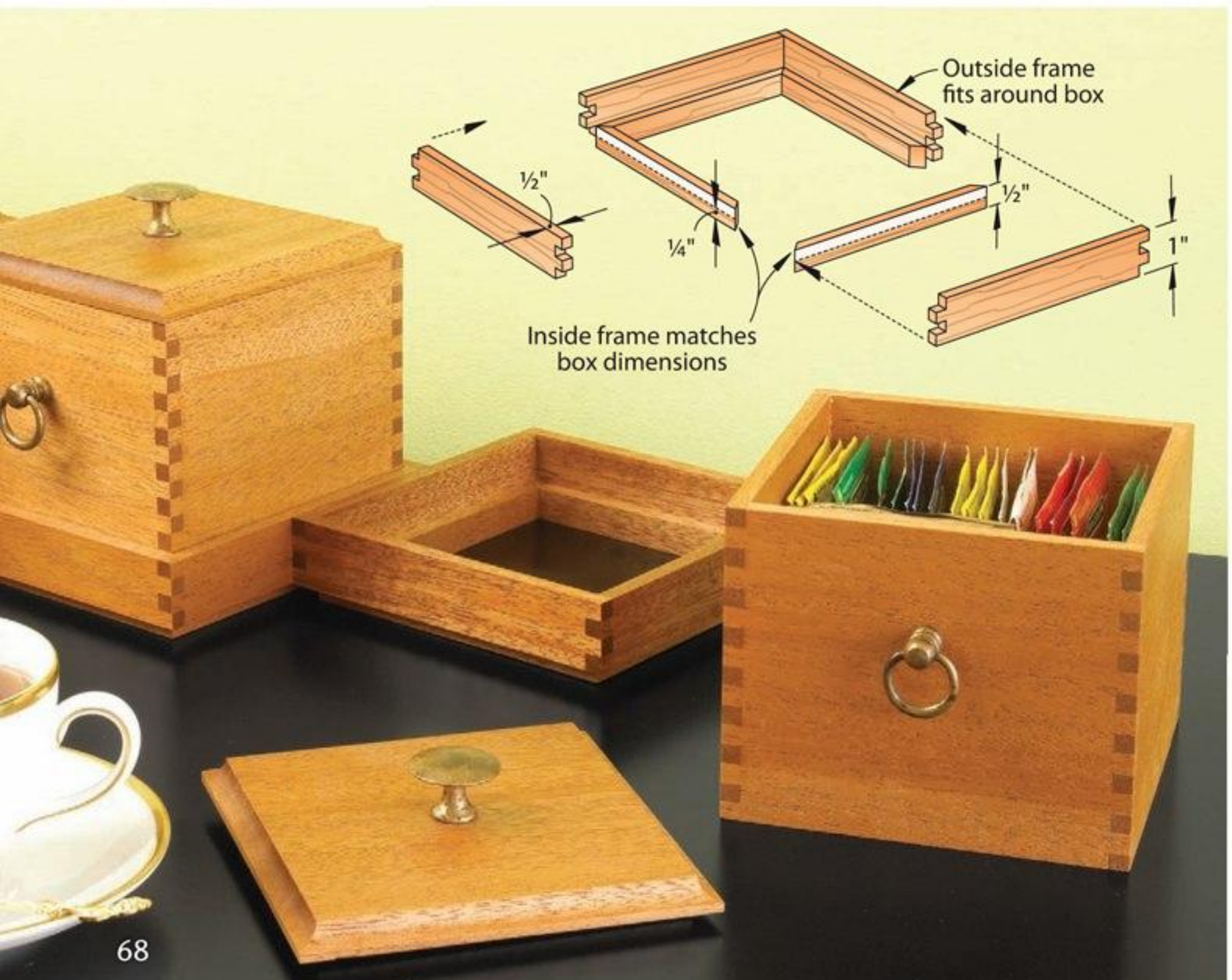
The box at *right* appears to float just above the tabletop, thanks to small feet hidden in the recess created by the bottom [**inset**].

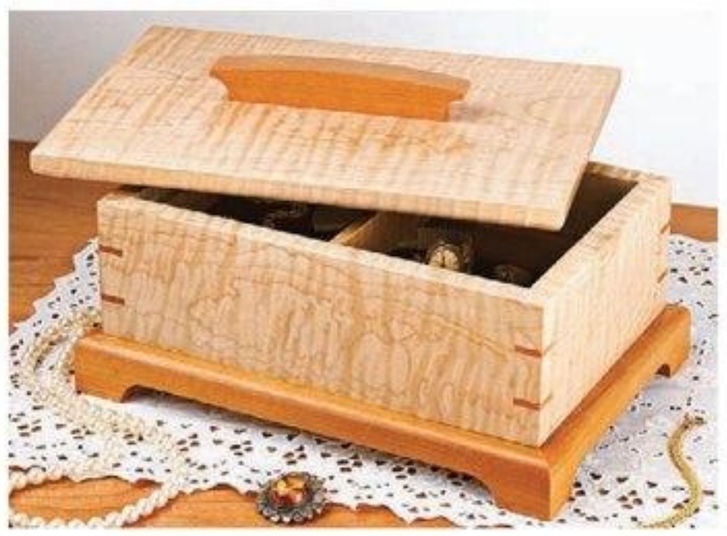


Set into each corner, the dark-colored feet match the lid and blend into the shadow created below the box.

## Build a place-holding base

Add a base to an existing box to "hold" its place while the box moves elsewhere. For example, take a box of tea from the set *below,* and the base stays with its mates to remind you to return the box to its proper place. To add this type of base easily, first build a frame to fit around the box [**drawing**]. Then build a second frame to fit inside the first. Glue the two together as shown to create a ledge to lift and support the box. Use the same type of joinery as on the box, or choose a different joint to distinguish the two. With some imagination and a recessed box bottom, the extra space below an unattached base can become a secret compartment, *below.*



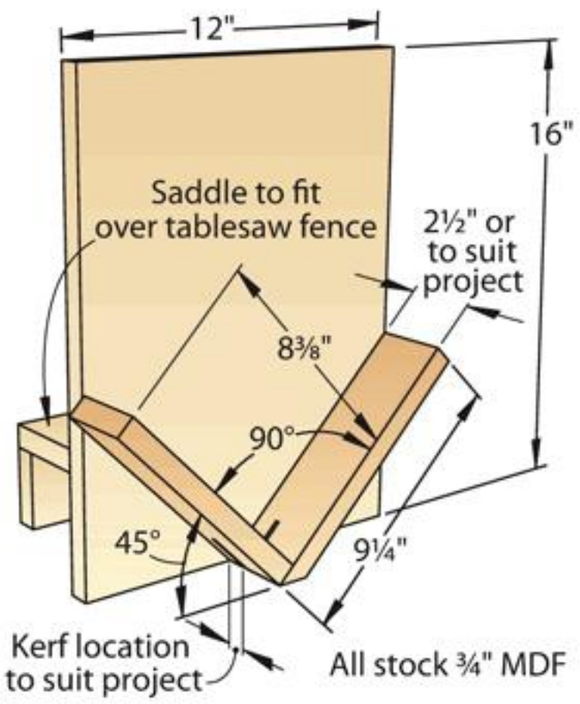
# Show off the joinery

Every corner provides an opportunity to add striking details to a box. The alternating end grain and face grain of box joints, *far right*, create a symmetrical look. (See **More Resources** on *page 71* for details about cutting box joints.)

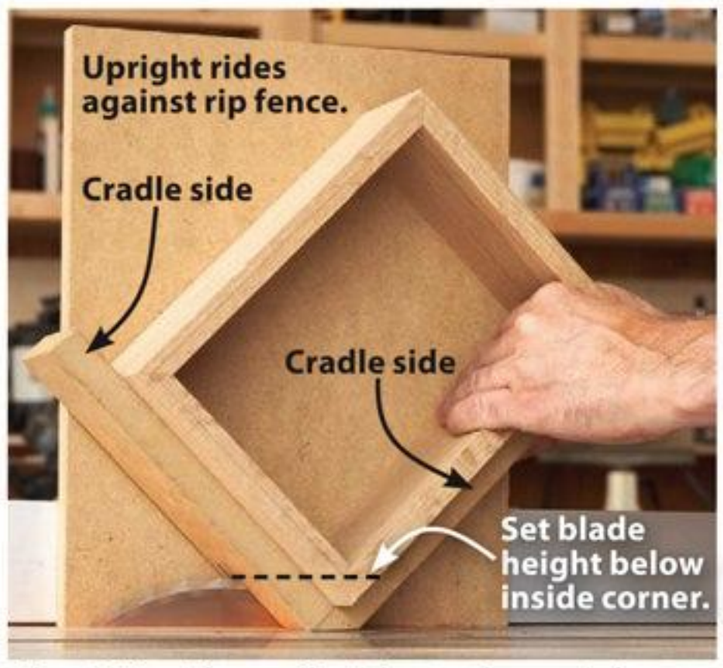
A rabbet joint like the one *below* has face grain glued to end grain, a bond that benefits from reinforcement. These rabbet joints were beefed up by drilling equally spaced ¼" holes through the box ends and into the sides, and gluing in lengths of ¼" dowel. Apply glue in the hole, not to the dowel, and twist the dowel as you insert it to spread the glue.

Miters hide end grain but also need reinforcement. Splines, *below, far right*, provide both strength and eye appeal. To add them, cradle the assembled box in a simple tablesaw sled, *below middle* and **drawing**, and cut slots in each corner. Plane contrasting stock to fit the kerfs. Glue in oversize splines, then cut and sand them flush after the glue dries.

**TABLESAW SPLINE SLED**



After sanding the dowels flush with the end panel and applying a finish, the end-grain provides a subtle accent.




Glue 2½"-wide cradle sides to the upright at 45° to the saw tabletop and 90° to each other. Run the sled along the rip fence.

# Crank up some metal

Metal accents, like the hardware on *page 66*, make projects literally sparkle. You can easily add shop-made metal accents like the aluminum handle and feet shown *opposite page, top left* using the woodworking tools you have now. They will cut and shape soft metals such as aluminum, brass, and thin copper. Find these materials at home centers.

To cut metals on the tablesaw, use a 60- or 80-tooth blade with a negative hook angle and triple-chip grind. Install a zero-clearance throat insert to help support the metal during the cut.

On the bandsaw, a ¼"- or ½"-wide, 6- or 8-tooth-per-inch blade works well for cutting metal, *near right*.

To bring out the bling, *far right*, polish metal with increasingly finer grades of abrasive pads, sanding sponges, sandpaper, and polishing compounds. Polish it enough, and aluminum will achieve a near mirrorlike shine.

**BANDSAW SOFT METALS**

Back up a nonferrous metal workpiece with a miter-gauge extension. Feed the stock into the blade slowly.

**HOW SHINY DO YOU WANT IT?**

Polish rods quickly by spinning them in a drill. Buff on tripoli compound with a soft rag. For flat aluminum, use a buffing wheel.

To fasten metals to your project, use epoxy. Woodworking glues won't bond to metal.

# Flip your lid

For the simple act of opening a box lid, choose from dozens of options. These four easy-to-install hinges [**Sources**] work and look great.

***Note:*** *Before mounting pin or barrel hinges, cut a couple of test pieces the same thickness as your box stock. Test drill press and router setups on these parts before working on the box.*

## PIN HINGES ALMOST DISAPPEAR

**Bore 5mm holes centered on the thickness of the edges of the lid and box. The chamfered edges serve as a stop to hold the lid at 90°, *inset*.**

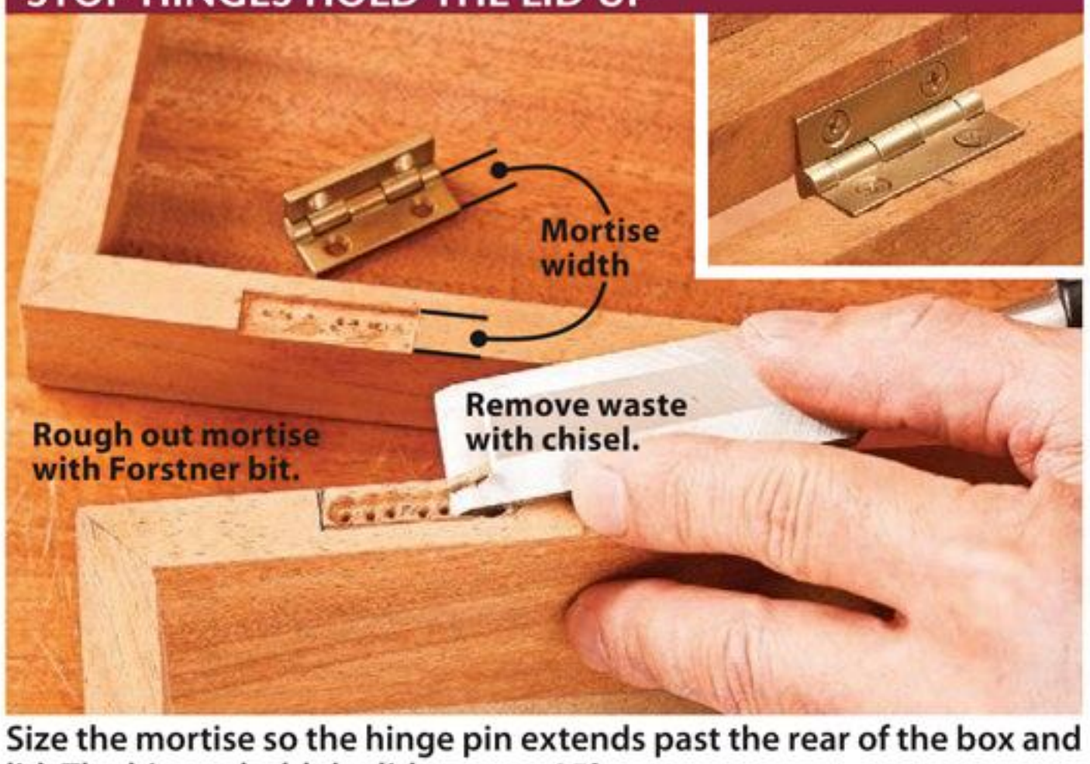
To drill the holes, mount a fence to your drill press and attach stopblocks on either side of the bit to align the box and lid holes. (Use a spacer against the bit to position each stopblock the same distance from the bit.) Rout the chamfers so one edge runs through the middle of the holes, *above*. After seating the hinges, close the lid to properly position them.

## ROLL OUT THE BARREL HINGES

**Bore 10mm holes centered on the thickness of the lid and box, then seat the hinges. Add a lid stay, *top inset*, to hold the lid open.**

Barrel hinges hide out of sight under a closed lid. To mount them, set up a drill-press fence and stopblocks, as for the pin hinges. Lay out the hinge locations, *above*. The hinges press in place—no adhesive needed. Close the lid to orient the hinges, then open the lid and adjust the screw in each barrel to expand the barrel so it firmly grips the sides of the hole.

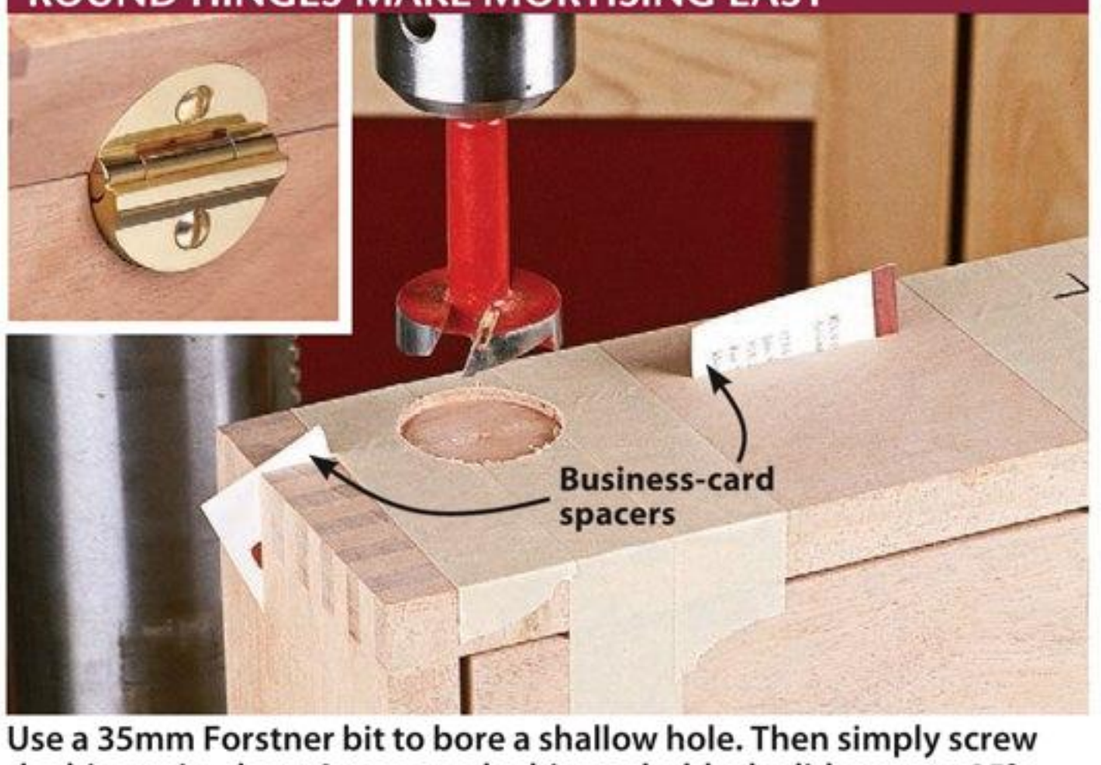
## STOP HINGES HOLD THE LID UP




**Size the mortise so the hinge pin extends past the rear of the box and lid. The hinges hold the lid open at 95°.**

Lay out the hinge position on the lid and box. Then, using a Forstner bit, drill out most of the waste to match the thickness of a hinge leaf, *above*. Score along the layout lines with a chisel, then remove the remainder of the waste. For testing the fit, substitute steel screws for the brass ones provided with the hinges. Drive the brass screws only after you're satisfied with the fit and operation of the hinges.

## ROUND HINGES MAKE MORTISING EASY




**Use a 35mm Forstner bit to bore a shallow hole. Then simply screw the hinges in place. A stop on the hinges holds the lid open at 95°.**

These hinges mount in a 35mm hole centered on the joint line between the lid and box, *above*. Tape the parts together with business cards pinched between them, then drill the holes to leave the hinge slightly proud of or flush with the surface. The stop mounts to the lower half of the hinge and supports the lid in an upright position—or leave it off so the lid opens 180° and rests against the back of the box.

# Now think inside the box

These finishing touches provide surprising beauty and function under the lid.

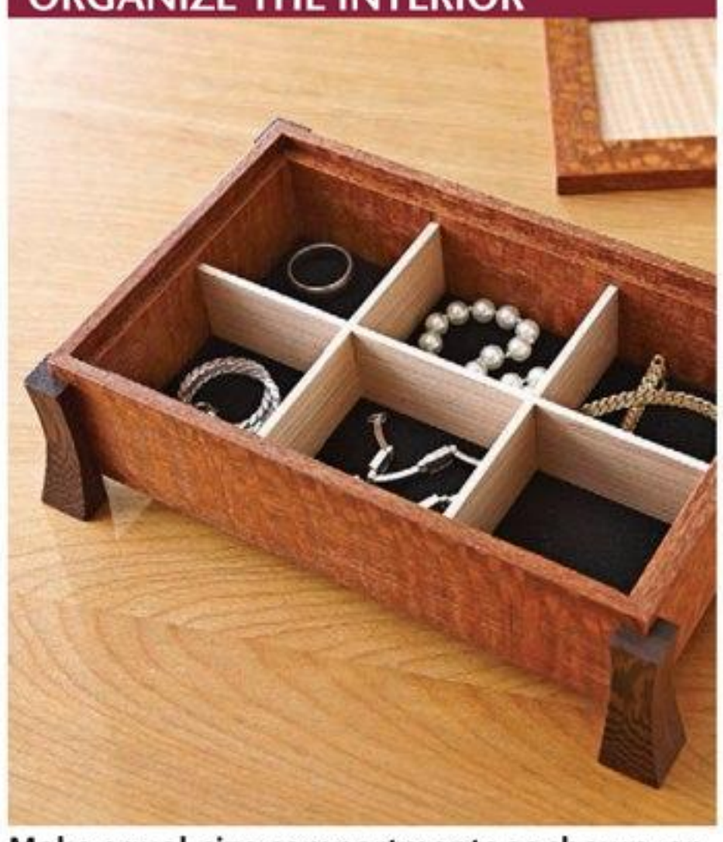
## Cross the great divide

Boxes beg to have things put into them. To keep those items organized, add a simple set of egg-crate dividers as shown *near right*.

To make your own, cut a kerf through a piece of scrap, and plane and sand the divider stock to fit the kerf. Next, crosscut the pieces to fit the interior length or width of the box, and rip them to allow clearance below the lid. Lay out the intersections of the dividers. Set your tablesaw blade height to half the width of the divider stock, *far right*. To create several identical pieces, fasten a stopblock to a miter-gauge extension.

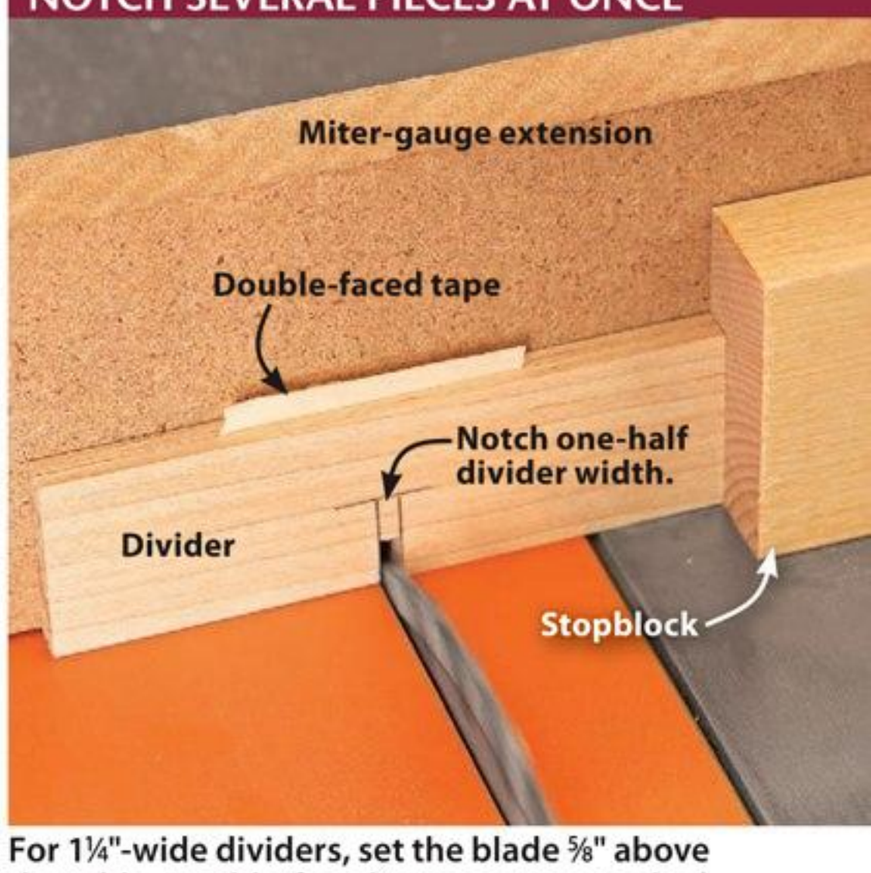
Assemble the dividers by sliding the notches into each other.

**ORGANIZE THE INTERIOR**



Make equal-size compartments as shown, or position the dividers to create a mix of large and small spaces.

**NOTCH SEVERAL PIECES AT ONCE**



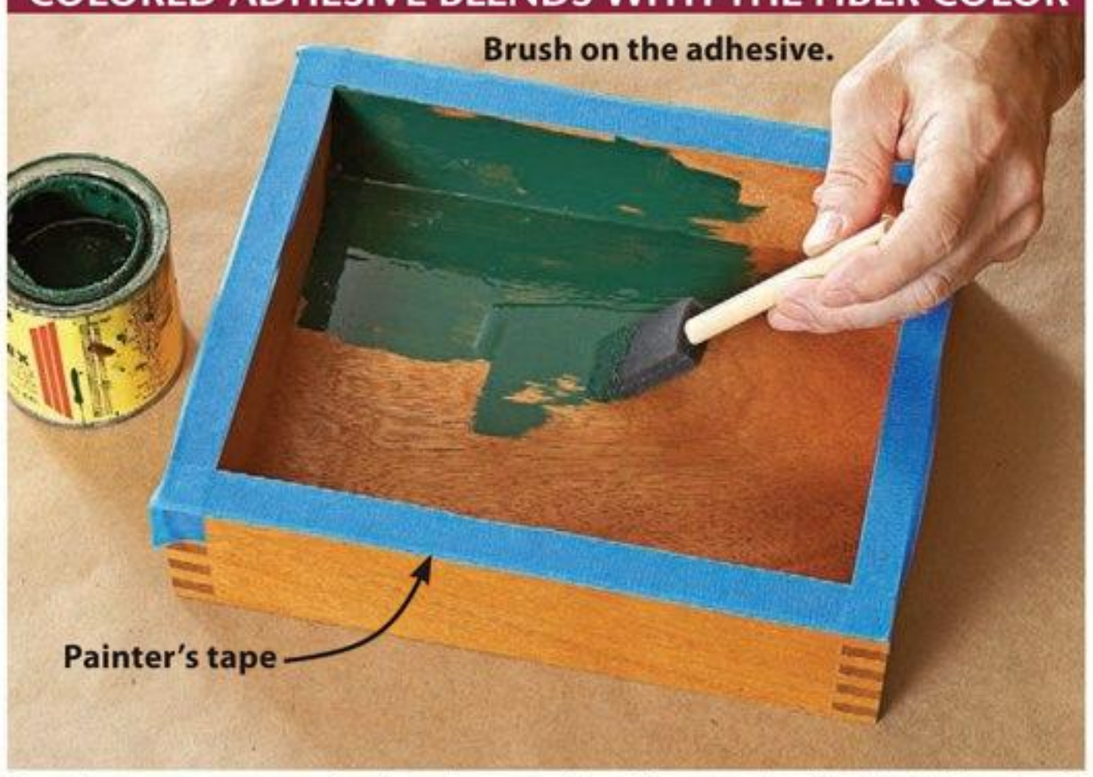

For 1¼"-wide dividers, set the blade ⅝" above the table. Double-faced tape secures stacked workpieces to the extension and each other.

## Everyone likes a soft touch

A layer of felt or fabric cushions delicate jewelry and adds a touch of elegance. Wrap the material around a cardboard or hardboard insert, as in the display table on *page 40,* or apply self-adhesive felt directly to the bottom, as in the small box on *page 62*.

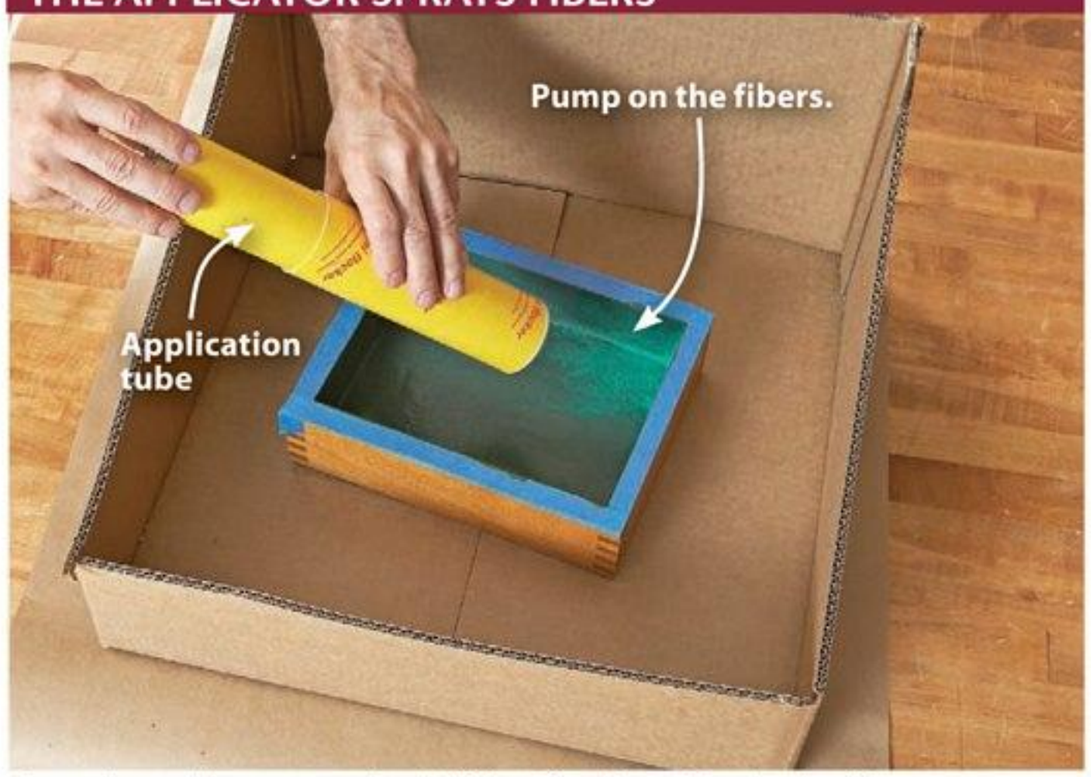
Flocking provides another option and creates a soft, seamless covering, even on vertical surfaces. Flocking consists of fine fibers, available in a variety of colors [**Sources**]. To use it, brush on the colored adhesive, *below left*, then load the cardboard-piston flocking tube with fibers. Pump the tube, *below right*, and the fibers whoosh out and stick to the adhesive. Shake out any loose fibers.

**COLORED ADHESIVE BLENDS WITH THE FIBER COLOR**




Brush an even coat of adhesive on all surfaces to be flocked. Mask off adjacent areas with painter's tape.

**THE APPLICATOR SPRAYS FIBERS**




A cardboard box contains drifting flocking. Apply the fibers generously. After the adhesive dries, collect excess fibers for reuse.

## MORE RESOURCES

### FREE VIDEOS

- Watch how to set up your tablesaw to cut perfect miters and bevels at woodmagazine.com/tsaccuracy.
- See how to make and use a simple box-joint jig at woodmagazine.com/boxjointvid.

### FREE PLAN

- Print off a free plan to construct a miter-spline jig at woodmagazine.com/splinejig.

### RELATED PLAN

- Build a simple box-joint jig with the plan at woodmagazine.com/ezboxjointjig. $

$ - Download this article for a small fee.

## Sources

**Veneer:** B&B Rare Woods, 303-986-2585, wood-veneers.com.
**Hinges:** Pin hinge no. 00D81.50, Lee Valley, 800-871-8158, leevalley.com; non-mortise barrel hinge no. 27C11, 35mm round stop hinge no. 129713, Woodcraft, 800-225-1153, woodcraft.com; 2" inside-stop piano hinge no. L3247, Craft Inc. 800-827-2388, craft-inc.com.
**Flocking:** Suede-Tex adhesives and flocking fibers, Woodcraft.
**Surface-applied hardware:** Decorative corners no. 149756, Woodcraft; jewelry box handle no. 27742, jewelry box snap catch no. 22310, Rockler, 800-279-4441, rockler.com.

Produced by **Craig Ruegsegger** with **Kevin Boyle** Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

# 2011 WOOD® MAGAZINE INNOV8 AWARDS

**Tool manufacturers live and die by the innovations they bring to the wood-working marketplace. Here are the eight new products we judge most innovative for the coming year.**

## 8 It's a glider, not a slider

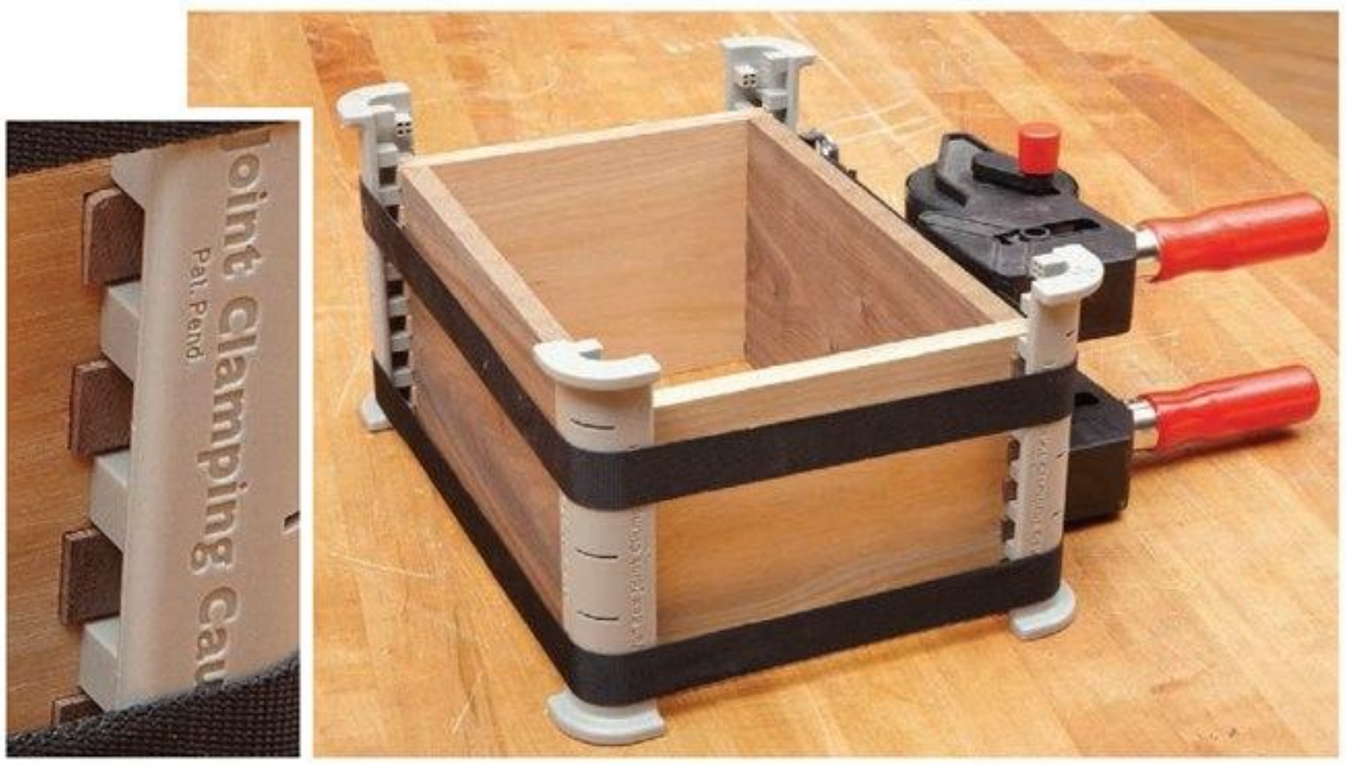
Take one look at Bosch's new 12" saw, and what you *don't* see reveals the innovation. Bosch replaced the traditional tubular rails that the saw head slides on with an articulated-arm system that yields a super-smooth glide forward and back. Another big benefit: You can position this saw tightly against a shop wall because it doesn't need the extra space at the rear for the rails.

**Bosch**
**12" Axial-Glide Mitersaw, #GCM12SD, $800**
**877-267-2499, boschtools.com**

## 8 Glue up perfect box joints with these handy cauls

Box joints have been a staple of wood-working for centuries, but the slightly proud fingers (which will be sanded flush later) prevent you from applying the necessary clamping force where you need it most—directly at the joint. Rockler's Box-Joint Clamping Cauls deliver the solution with corner blocks that have matching fingers. Simply clamp one caul on each corner with a band clamp or two for perfect glue-ups. The cauls come in 4-packs for ¼", ⅜", and ½" fingers.

**Rockler**
**Box-Joint Clamping Cauls, $10 per 4-pack.**
**800-279-4441, rockler.com**



## 8 Beefy drill press solves common problems

Delta's new 18" drill press delivers solutions to two common complaints: difficult-to-set drive-belt tension and inadequate quill stroke. Instead of wrenching on the motor every time you change speeds, a quick-release idler roller on the 18-900L retracts without tools for quick belt changes among its 16 speeds, and when reengaged maintains the right level of belt tension. This machine also features an industry-leading 6" quill stroke with just one rotation of the handle. Its large table tilts 90° side-to-side and 45° forward. Cross-hair lasers and an LED task light illuminate the work area.

**Delta**
**18" Drill Press, #18-900L, $829**
**800-223-7278, deltaportercable.com**

## 8 Compact router kit gives you lightweight options

We savor small routers—call 'em trim routers or compact routers; we don't care—for light-duty jobs where even a midsize 2-hp router proves cumbersome. So we love the flexibility DeWalt's DW611PK two-base kit provides. You can swap the 1¼-hp variable-speed motor between the fixed and plunge bases quickly to fit the task at hand. Weighing just under 6 pounds in its plunge base, this lightweight router works great for sign-making and routing inlays, stopped flutes, and hinge mortises. It uses only a ¼" collet, limiting you to ¼"-shank bits. It includes an edge guide for the plunge base. (Porter-Cable will offer a similar kit with a single-speed motor for $189.)

**DeWalt**
**Two-Base Compact Router Kit, #DW611PK, $199**
**800-433-9258, dewalt.com**

## Portable cyclone adjusts airflow automatically

Add this to the "Why didn't I think of that?" category. Oneida's Smart Dust Collector works, essentially, as a variable speed cyclone collector. It measures the amount of resistance (static pressure) in the ductwork, and then adjusts the impeller speed automatically to generate the maximum amount of suction. This allows it to work effectively on 2½" flex-hose and 6" smooth-wall duct. It has a remote-control power switch, 6" inlet, HEPA filter with flame-guard protection, and an infrared sensor to alert you when the 35-gallon steel collection drum needs emptying.

**Oneida Air Systems**
**Smart Dust Collector, 2-hp #XXS020100, $1,987; 3-hp #XXS030100, $2,360**
**800-732-4065, oneida-air.com**

## Sharpen those spade bits rather than toss them

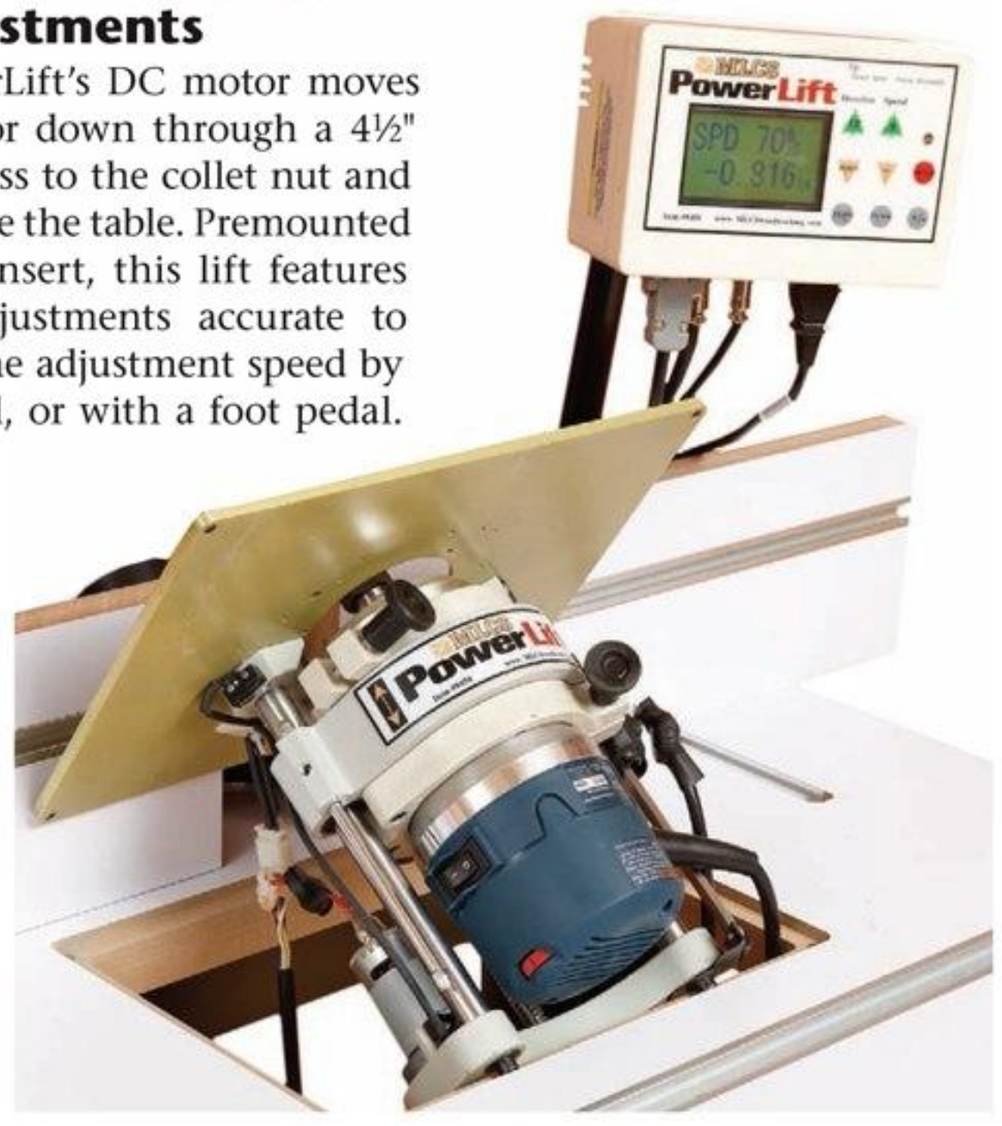
Most people use spade-type drill bits until they're dull or rusty, then toss them aside. Now you can sharpen dull spade bits, from ¼" to 1½" wide, on the Drill Doctor DDSB. To sharpen a spade bit, slip it into the holder, turn the power on, and press the gray housing down to engage the grinding wheel. Then use the finger lever to slide the wheel back and forth along the bit's flute. (The tapered wheel matches the angles for rim spurs.) Like predecessor Drill Doctor models, this unit also sharpens standard twist bits from 3⁄32" to ½".

**Drill Doctor**
**Drill Doctor DDSB, $99**
**800-597-6170, drilldoctor.com**

## Electric router lift makes precise adjustments

The MLCS PowerLift's DC motor moves your mounted router up or down through a 4½" range, giving you full access to the collet nut and spindle to change bits above the table. Premounted to a ¼"-thick aluminum insert, this lift features digital readout depth adjustments accurate to .001". And you can vary the adjustment speed by hand on the control panel, or with a foot pedal. Slow it down to make fine adjustments, then speed it up to raise the bit for above-the-table changes. The PowerLift comes ready to fit a 3½"-diameter router motor, which includes most midsize 1½- to 2¼-hp routers.

**MLCS Woodworking**
**PowerLift Router Lift, #9450, $390**
**800-533-9298, mlcswoodworking.com**




## Auto-adjust jig makes quick work of pocket holes

Just when you thought there was nothing left to invent in pocket-hole joinery, the folks at Porter-Cable come out with this beefy jig. The mostly-metal QuikJig differs from other pocket-hole jigs in that you set the bit's drilling depth once and never change it. The drilling guide snugs up against your workpiece, automatically adjusting for thicknesses from ⅝" to 1½". When you drill, the bit's stop collar hits the top of the guides to give you the perfect depth. And for long workpieces, simply rotate the jig 90°, remove the chip-collection tray, and feed stock horizontally.

**Porter-Cable**
**QuikJig Pocket-Hole Joinery System, #560, $229**
**888-848-5175, deltaportercable.com**

Watch FREE demo videos of many of these products in "Tool School" at: woodmagazine.com/videos

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## Secondhand liability

**Q: After reading about the tablesaw lawsuit in issue 199 (September 2010), I began to worry about the pending sale of my old tablesaw and jointer. If I sell them and the buyer hurts himself, am I liable? Would it be less trouble to just haul them to the scrapyard?**

*—John Durda, Oxnard, Calif.*

**A:** Don't toss those tools just yet, John. We posed your legal stumper to Keith Miller, professor of Law at Drake University Law School in Des Moines, Iowa. According to Keith, the court systems don't attach the same strict liability to "casual sellers" that they do to manufacturers, wholesalers, and retailers.

Unless you earn a significant part of your income dealing in used machinery, you fall into the "casual seller" category. For the most part, the courts have protected these individuals as long as an "as is, where is" understanding is in place—meaning the tool is sold in its present condition at the current location with no warranty implied. The "as is, where is" nature of secondhand tools is generally implied from casual sellers. But if it makes you feel safer, Keith suggests explicitly advertising them as such.

Now, some commonsense caveats: First, do your best to search out and include all the safety equipment that originally came with the tool. If you no longer have it, make sure the buyer knows this is part of the "as-is" condition of the tool. Or better yet, contact the manufacturer to purchase replacements (or for suggestions for suitable aftermarket versions). You could even use these new parts as a selling point! Second, if you've altered the tool significantly, especially in a way to make it more dangerous, a court of law could rule against you if the plaintiff proves that there was malice or negligence on your part.

*Editor's note: To read our coverage of the Osario v One World Technologies, Inc. lawsuit, visit woodmagazine.com/tstrial*

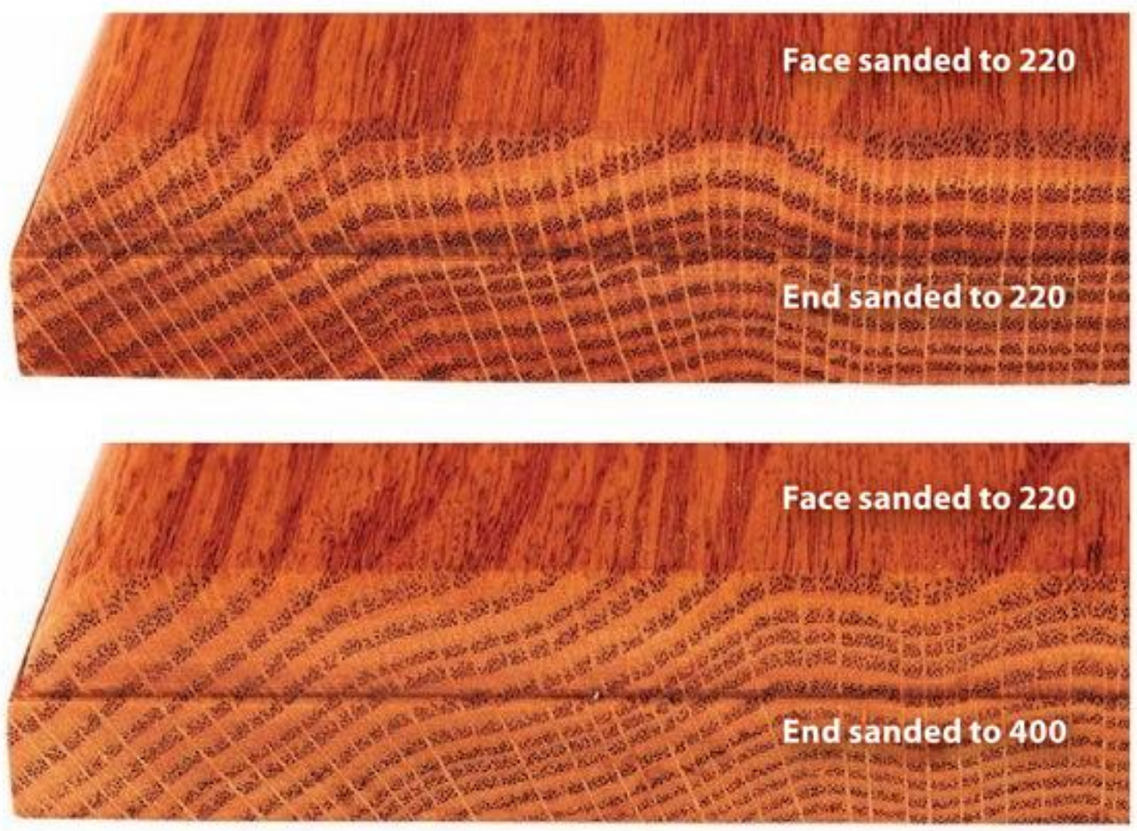
## Lighten up end grain

**Q: After staining an oak tabletop, the end grain on the table's edge came out noticeably darker than the top. What could I have done differently to make it blend better?**

*—Tony Toto, Hanover, Mass.*

**A:** End grain can be tricky, Tony, especially in porous woods such as oak. The open ends of the grain soak up more stain pigment than the less-porous faces and edges.

Sanding closes up some of those open cells, slowing the intake of the stain. The finer the grit, the less pigment will stick. For porous woods, as a rule of thumb, double the grit for end grain. So, if you sand through 220 grit for the faces and edges, sand the end grain up to about 400.




**Sanding to twice the grit on the end grain eliminates the noticeable dark line left by the stain's pigments.**

*continued on page 78*

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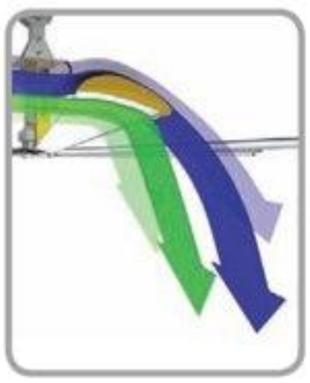

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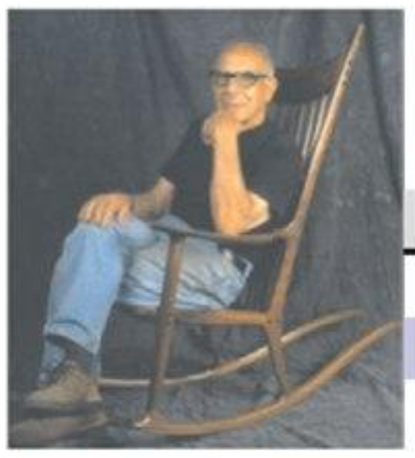

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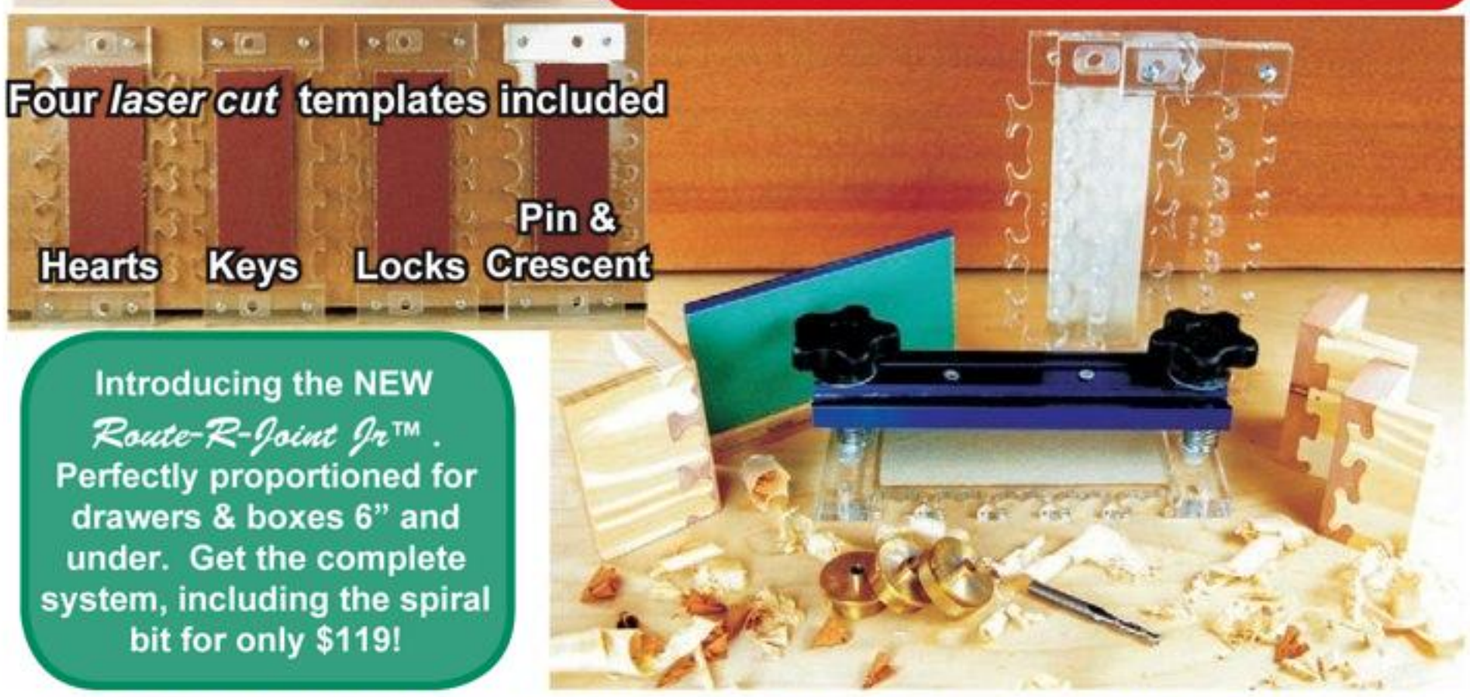


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# Ask WOOD

## Bugged by beetles

**Q: Some insect has infested my stack of drying cherry and red oak lumber. The oak, especially, has thousands of tiny holes with powder under each hole. It doesn't look like termites. Can you tell me what it is and how to get rid of it?**

*—Charles Edgington, Orlando, Fla.*

**A:** Sounds like powderpost beetles, Charles. Once your hardwood is infested, these little guys hatch, munch their way through the wood, and pop out, leaving tiny exit holes and signature piles of floury sawdust.

There are two common types of powderpost beetle: anobiid and lyctid. If the holes are about ⅛" in diameter, it's probably the anobiid.

The anobiid really only likes wet wood. Once it dries below about 20 percent moisture content, the beetles lose interest and the problem takes care of itself. A borate-based treatment, such as Bora-Care (Nisus Corporation, nisuscorp.com 800-264-0870), will slow the pests down, but you'll have to give the wood a thorough wetting with the treatment.

If the holes are about 1/32" to 1/16", you likely have the lyctid variety. These will continue to eat dried hardwoods.

Heat kills both types of beetles and their eggs. 130° for about 24 hours does the trick, making kiln drying an effective way to eliminate infestations. But be sure the kiln owner knows that you're handing over infested wood. He may not want to risk contaminating his operation.

In the meantime, quarantine the infected lumber from other wood (including your home and buildings). Powderpost beetles won't go after softwoods, such as the framing in most homes, but could spread to trim, cabinets, furniture, etc.

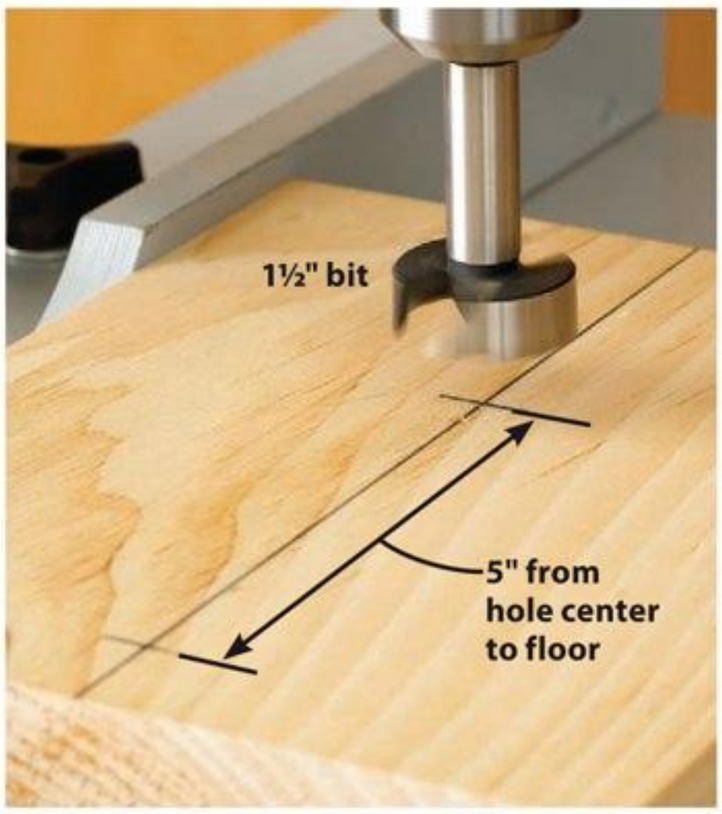
The telltale signs of a powderpost-beetle infestation: shotgun-blast-like holes and powdery piles of sawdust.

## Birdhouse basics

**Q: Our lake association plans to build several bluebird houses. How big should I make the entrance, and how high off the floor of the birdhouse should it be located?**

*—Dick Webber, East Jordan, Mich.*

**A:** The U.S. Fish and Wildlife Service recommends making bluebird houses 5" square and 9" high on the inside, with a 1½" hole 5" above the floor. Leave the birdhouses unfinished both inside and out, and mount them 4–8' above the ground. If your group plans to follow up by helping house other bird species, refer to the chart below to guide your designs.




**BIRDHOUSE CONSTRUCTION AND MOUNTING GUIDELINES**

| Bird | Width/depth, height | Entry-hole size | Hole height above floor | Mounting height |
|---|---|---|---|---|
| Carolina wren | 4", 8" | 1⅛" | 1–6" | 6–10' |
| Chickadee | 4", 8–10" | 1⅛" | 6–8" | 4–15' |
| Flycatcher | 6", 8–12" | 1½" | 6–10" | 5–15' |
| House finch | 6", 6" | 2" | 4" | 8–12' |
| Nuthatch | 4", 8–10" | 1⅜" | 6–8" | 5–15' |
| Red-headed woodpecker | 6", 15" | 2" | 10" | 20–40'* |
| Titmouse | 4", 10–12" | 1¼" | 6–10" | 5–15' |
| Swallow | 5", 6–8" | 1½" | 4–6" | 5–15' |
| Warbler | 4", 8" | 1¼" | 6" | 2–12'** |

*Outer surfaces should be bark. Before mounting, pack the inside with sawdust that the woodpecker will remove. **Mount house beside or over water.



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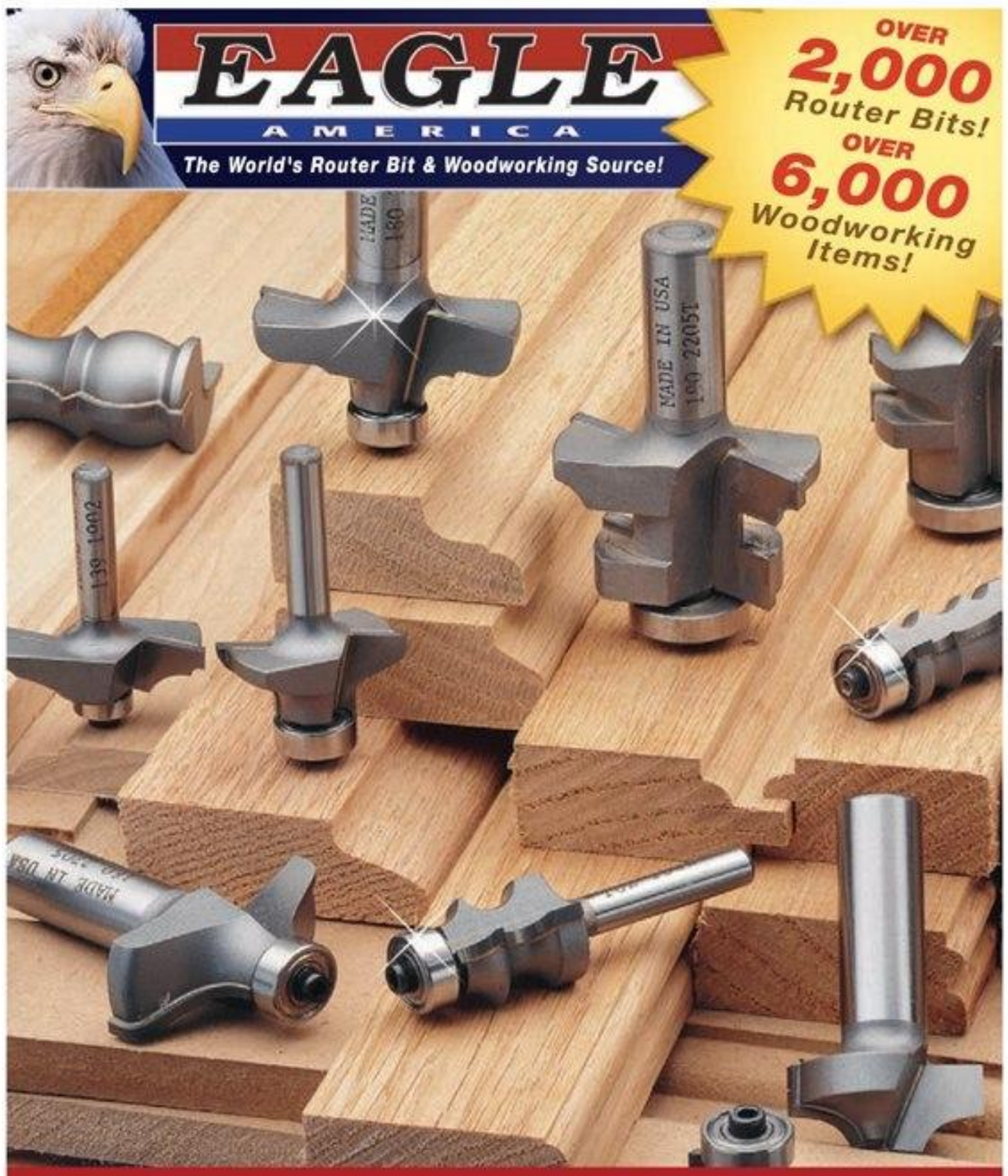

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# Shop-Proven Products

These woodworking wares passed our shop trials

## About our product tests

We test hundreds of tools and accessories, but only those that earn at least three stars for performance make the final cut and appear in this section. Prices are current at the time of article production and do not include shipping, where applicable.

## Beefy trim router proves more than capable

From the moment I picked up Ridgid's R2401 trim router I was impressed. The overmolded grip proved a perfect fit for my hand, and its heft told me this was no toy. And when I fired it up and began routing wood, its performance confirmed my impressions. Despite its compact size, the R2401 muscled through every task I threw at it: round-overs, coves, beads, chamfers, flush trimming, and even ¼" dadoes.

This router features a soft-start motor with variable speeds from 20,000 to 30,000 rpm, and the lighted plug on its 12'-long cord indicates when it's "live." The R2401 comes with two bases—square and round—as well as an edge guide, two wrenches, a flush-trim bit, and a zippered canvas storage bag.

*—Tested by Craig Ruegsegger, Multimedia Editor*

**Trim router, #R2401**

| | |
|---|---|
| Performance | ★★★★★ |
| Price | $100 |

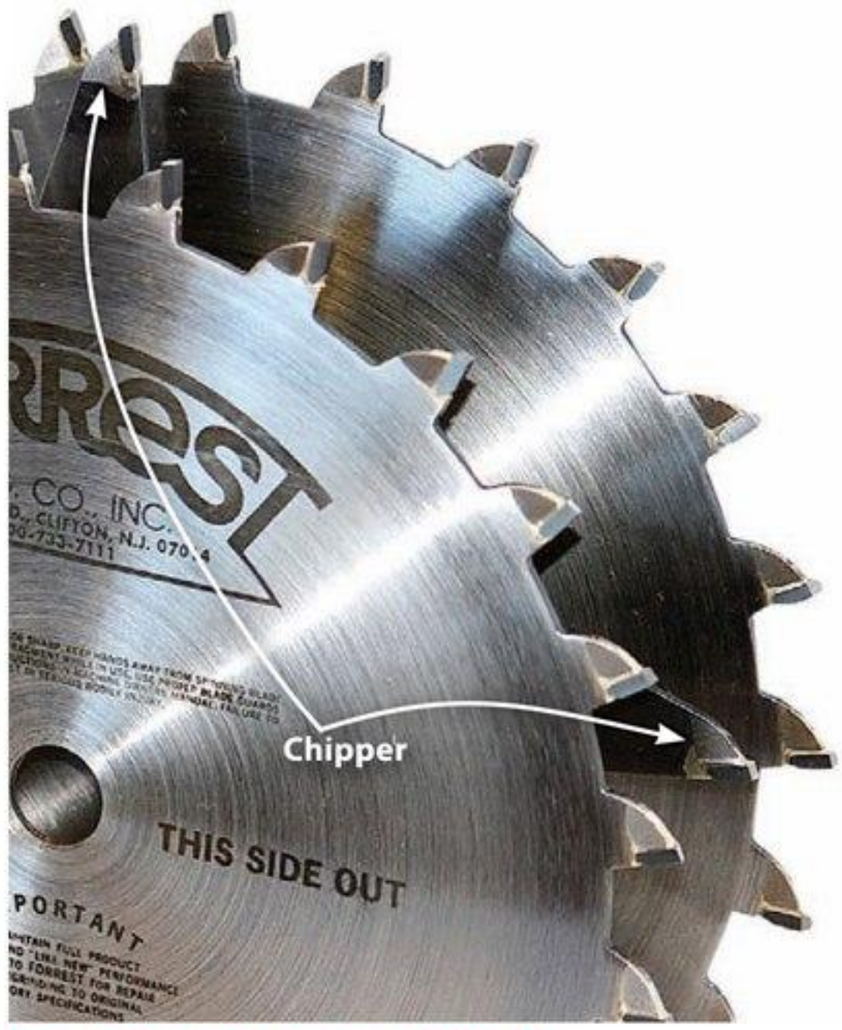
Ridgid
866-539-1710; ridgid.com

## Thin-kerf dado stacks up for less-than-¼" sheet goods

I use a great deal of ¼" plywood for drawer bottoms and cabinet backs in my furniture, but cutting dadoes and grooves can be time-consuming because these sheets typically measure less than ¼" thick. So I have to make two passes with my standard tablesaw blade to get the desired fit. But with Forrest's Special-Width Dado King, I now make those cuts in one pass with amazing precision.

Stack the two outer blades of this 8" set together to cut a perfect 3/16"-wide groove. Then add any of six magnetic shims to fine-tune the cut. The set also includes a 1/16" chipper for grooves ¼" or wider. The negative tooth-hook angle prevents grain tear-out in hardwoods, veneered plywood, even melamine.

*—Tested by Matt Seiler, a custom-furnituremaker*




**Special-Width Dado King, #DK0824316**

| | |
|---|---|
| Performance | ★★★★★ |
| Price | $189 |

Forrest Manufacturing
800-733-7111; forrestblades.com

## Specialty hinges prevent slamming chest lids

I've designed and built lots of toy boxes and blanket chests over the years, and I've never found lid hinges that work as well as Rockler's Lid-Stay Torsion Hinges. (We used them on the toy box on *page 34*.) Based on the concept of laptop computer hinges, these Lid-Stays hold a lid in place at any angle, preventing it from dropping onto the chest. That's especially valuable when children reach into a toy box to retrieve toys.

But these hinges aren't universal for all projects: heavier lids will require specific hinges based on its size and weight. Fortunately, Rockler has a torsion calculator on its Web site to help you find the right hinges, available in three sizes and two colors (bronze and silver).

*—Tested by Kevin Boyle, Senior Design Editor*

**Lid-Stay Torsion Hinges**

| | | |
|---|---|---|
| Performance | | ★★★★★ |
| Price | Single hinge | $20 |
| | Two-Pack | $38 |

Rockler Woodworking and Hardware
800-279-4441; rockler.com

*continued on page 82*

# Time travel at the speed of a 1935 Speedster?

The 1930s brought unprecedented innovation in machine-age technology and materials. Industrial designers from the auto industry translated the principles of aerodynamics and streamlining into everyday objects like radios and toasters. It was also a decade when an unequaled variety of watch cases and movements came into being. In lieu of hands to tell time, one such complication, called a jumping mechanism, utilized numerals on a disc viewed through a window. With its striking resemblance to the dashboard gauges and radio dials of the decade, the jump hour watch was indeed "in tune" with the times!

The Stauer *1930s Dashtronic* deftly blends the modern functionality of a 21-jewel automatic movement and 3-ATM water resistance with the distinctive, retro look of a jumping display (not an actual jumping complication). The stainless steel 1 1/2" case is complemented with a black alligator-embossed leather band. The band is 9 1/2" long and will fit a 7–8 1/2" wrist.

*True to Machine Art esthetics, the sleek brushed stainless steel case is clear on the back, allowing a peek at the inner workings.*

Try the Stauer *1930s Dashtronic* Watch for 30 days and if you are not receiving compliments, please return the watch for a full refund of the purchase price. If you have an appreciation for classic design with precision accuracy, the *1930s Dashtronic* Watch is built for you. This watch is a limited edition, so please act quickly. Our last two limited edition watches are totally sold out!

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www.stauer.com

## Dead-flat router table weighs little, works large

Sommerfeld's 27×36" router table features a flatter surface and more accessory options than any table I've used. The top consists of three 9×36" extruded aluminum sections that, when coupled together, proved perfectly flat as well as slippery smooth. And this top hasn't sagged at all in the six months I've been using it, even with my heavy 3-hp router suspended below. Because the router mounts directly to the top, there's no fussy insert plate to level. (You can order the top predrilled for Triton routers, or with no holes so you can drill to match your router.) T-slots on the bottom and the included bolts made it easy for me to mount this top to an existing cabinet in my shop.

With four miter-gauge slots and four T-slots, the top gives me lots of options for hold-downs, feather boards, and stopblocks. I also appreciate the eight easy-to-install insert rings, with openings from ½" to 2⅝", that step down the 3⅝"-diameter bit opening.

I found the fence equally impressive, with sliding infeed and outfeed faces that can be shimmed from behind for offset routing, and T-track on the face and top for mounting accessories. It comes with three removeable zero-clearance inserts, and a dust hood with a stepped port for hoses from 1¼" to 2¼" (inside diameter). You can also buy an open-leg metal stand (#LSD5) for $120.

*—Tested by Kevin Boyle, Senior Design Editor*

**Router tabletop with fence, #SORS**

| | |
|---|---|
| Performance | ★★★★★ |
| Price | $550 |

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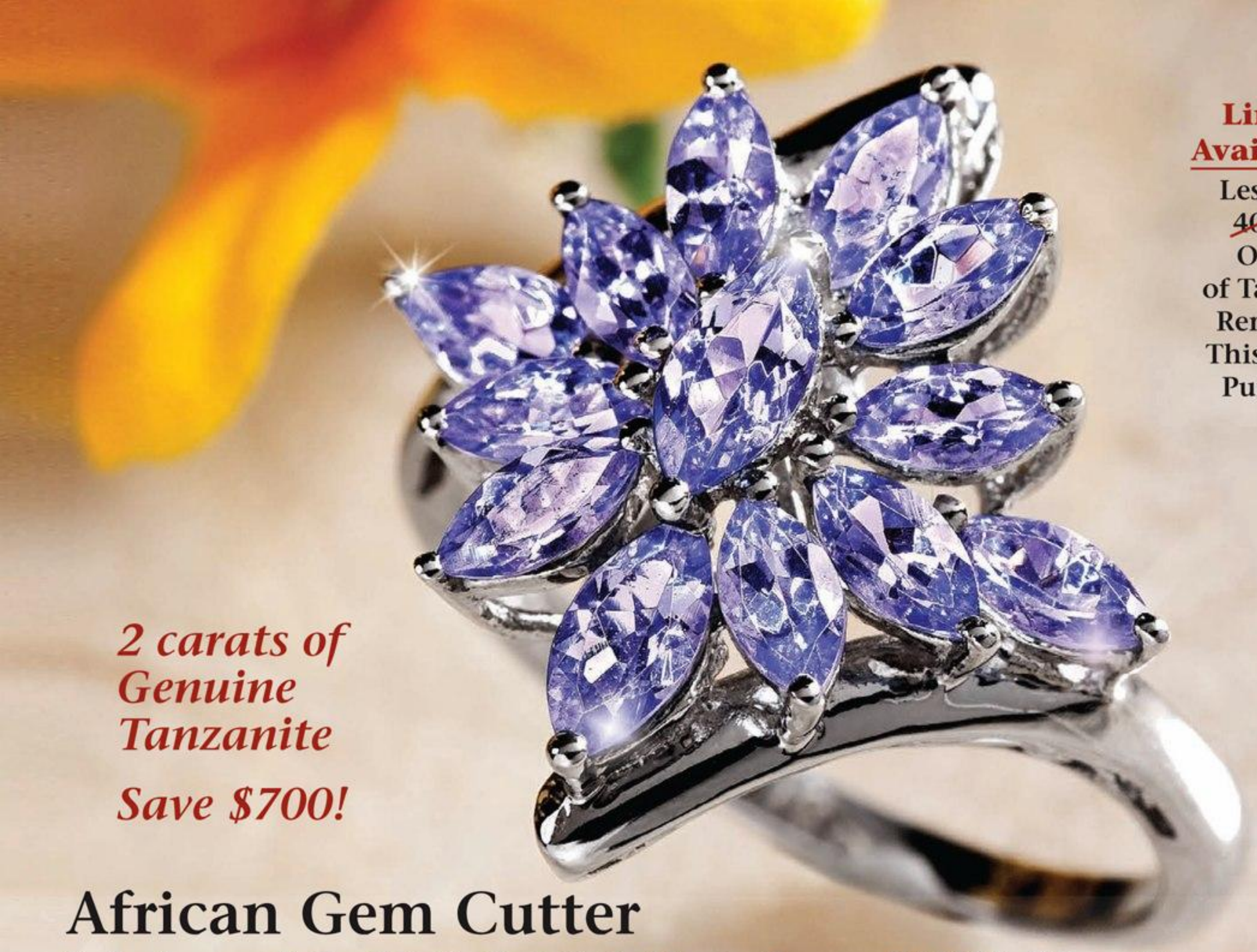

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This story breaks my heart every time. Allegedly, just two years after the discovery of tanzanite in 1967, a Maasai tribesman knocked on the door of a gem cutter's office in Nairobi. The Maasai had brought along an enormous chunk of tanzanite and he was looking to sell. His asking price? Fifty dollars. But the gem cutter was suspicious and assumed that a stone so large could only be glass. The cutter told the tribesman, no thanks, and sent him on his way. Huge mistake. It turns out that the gem was genuine and would have easily dwarfed the world's largest cut tanzanite at the time. Based on common pricing, that "chunk" could have been worth close to $3,000,000!

The tanzanite gem cutter missed his chance to hit the jeweler's jackpot...and make history. Would you have made the same mistake then? Will you make it today?

**In the decades since its discovery, tanzanite has become one of the world's most coveted gemstones.** Found in only one remote place on Earth (in Tanzania's Merelani Hills, in the shadow of Mount Kilimanjaro), the precious purple stone is 1,000 times rarer than diamonds. Luxury retailers have been quick to sound the alarm, warning that supplies of tanzanite will not last forever. And in this case, they're right. Once the last purple gem is pulled from the Earth, that's it. No more tanzanite. Most believe that we only have a few years supply left, which is why it's so amazing for us to offer this incredible price break. Some retailers along Fifth Avenue are more than happy to charge you outrageous prices for this rarity. Not Stauer. Staying true to our contrarian nature, we've decided to ***lower the price of one of the world's rarest and most popular gemstones.***

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WOOD MAGAZINE TOP NEW TOOLS 2009

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**16.** Publication of Statement of Ownership for a Requester Publication is required and will be printed in the December/January 2010/2011 issue of this publication.
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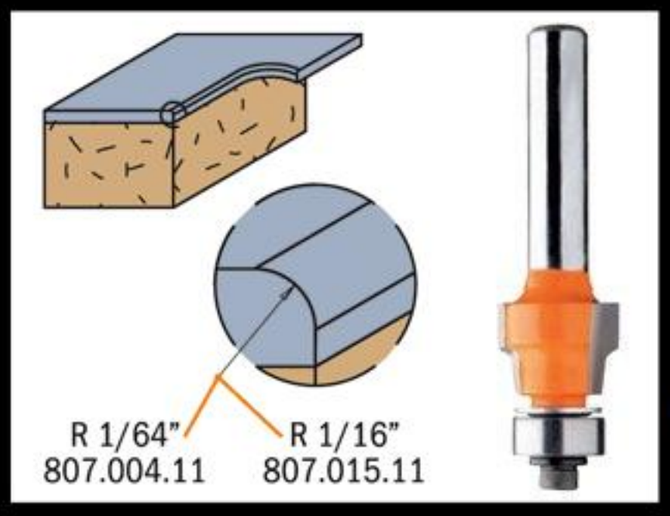


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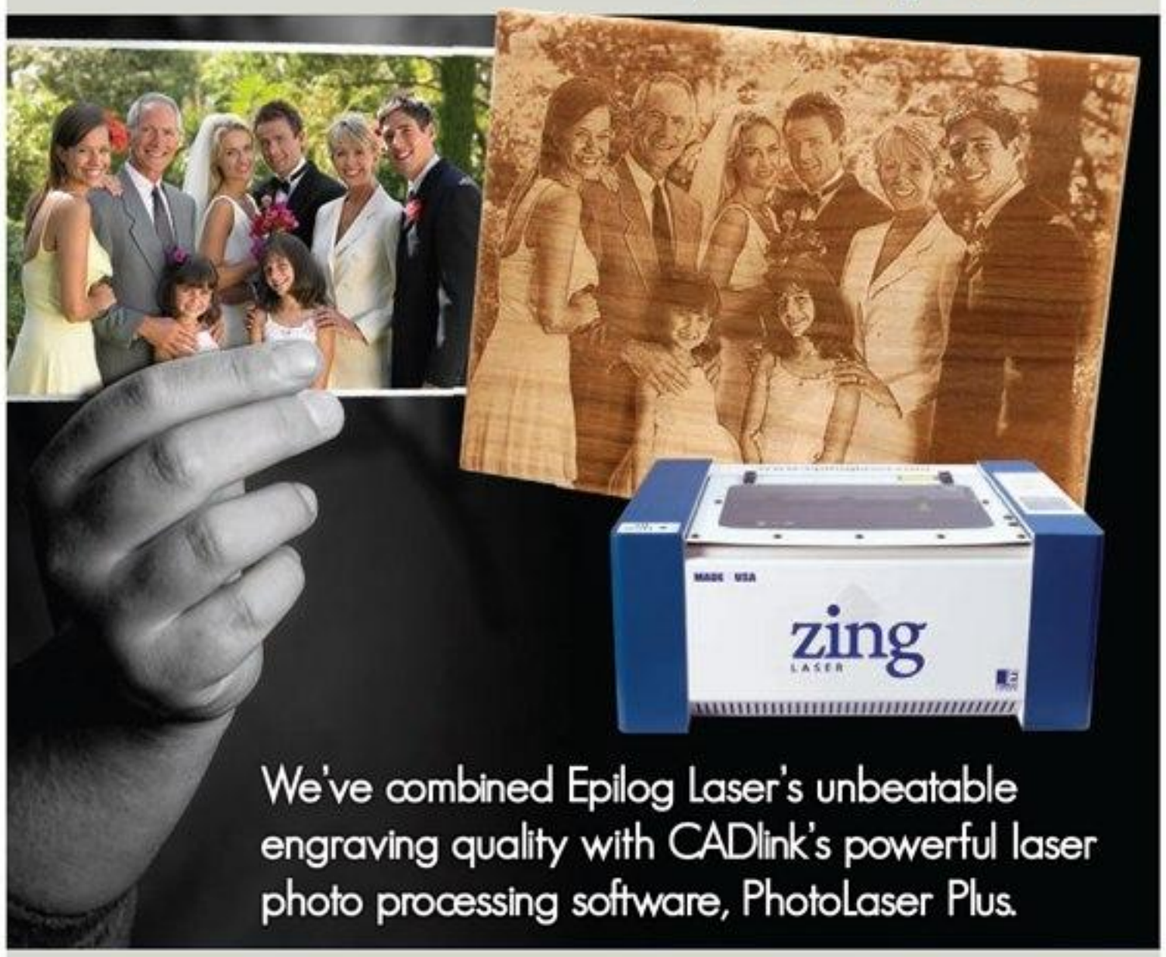


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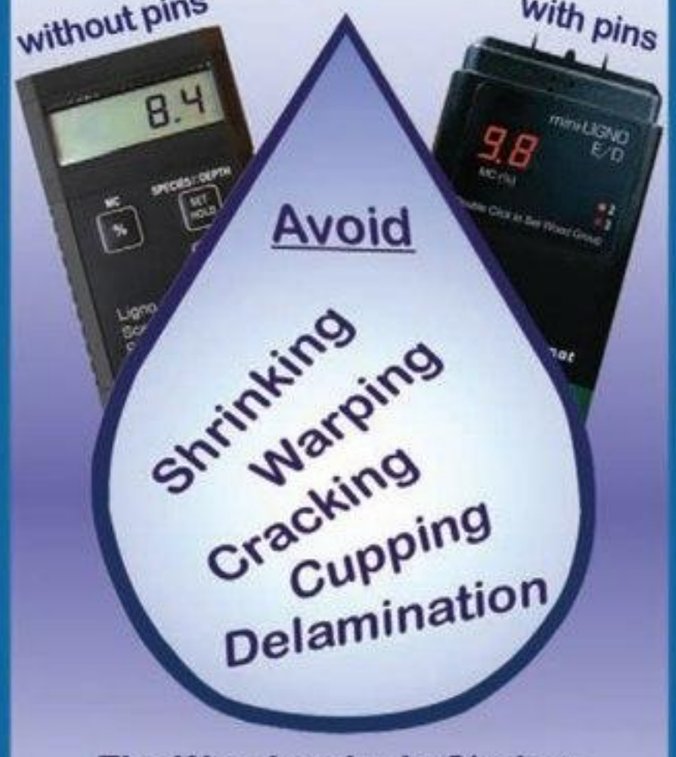


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### Double-decker lighted curio

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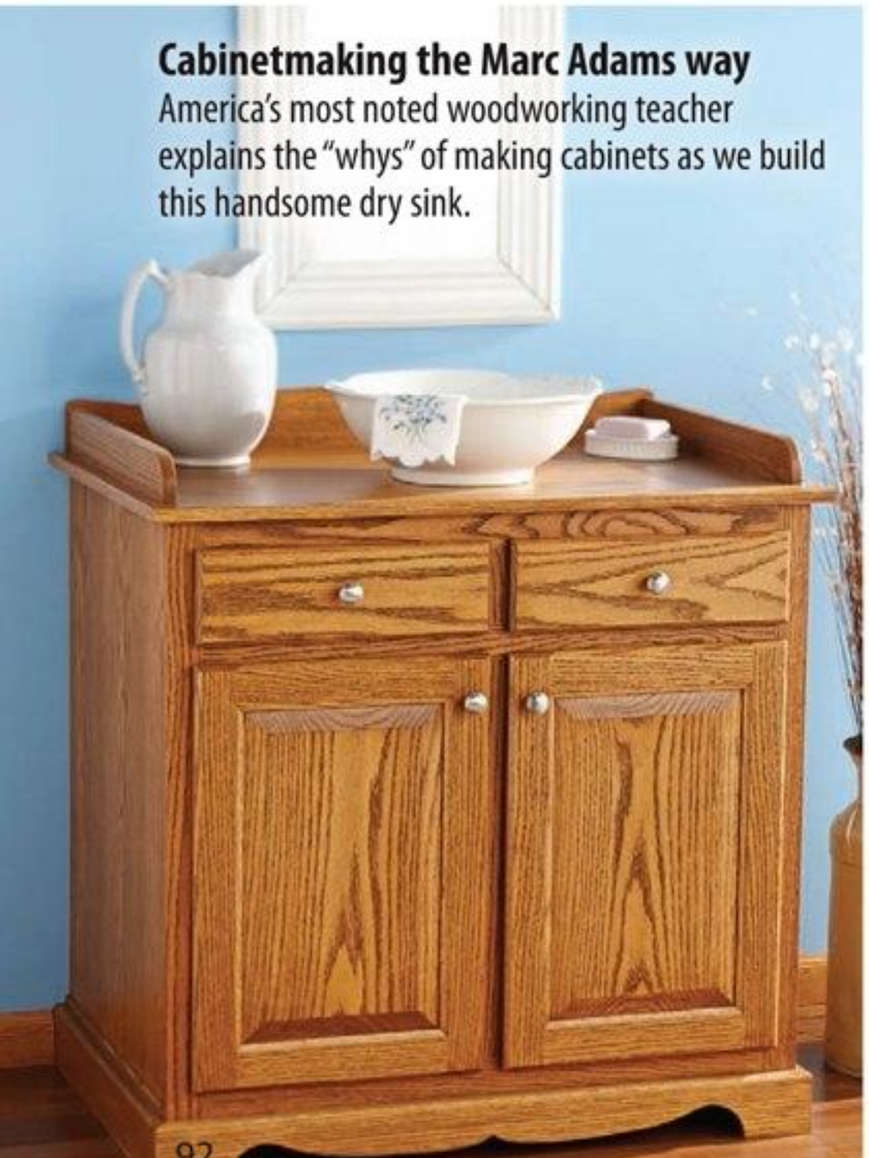

### Cabinetmaking the Marc Adams way

America's most noted woodworking teacher explains the "whys" of making cabinets as we build this handsome dry sink.

TOOL TEST

### Oscillating multi-tools

We test nine product choices in this expanding category.

### Turn green-wood bowls

Photo-by-photo, how to go from fresh-cut log to finished bowl using an easy-to-master method.

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WOOD MAGAZINE TOP TOOL APPROVED 2010

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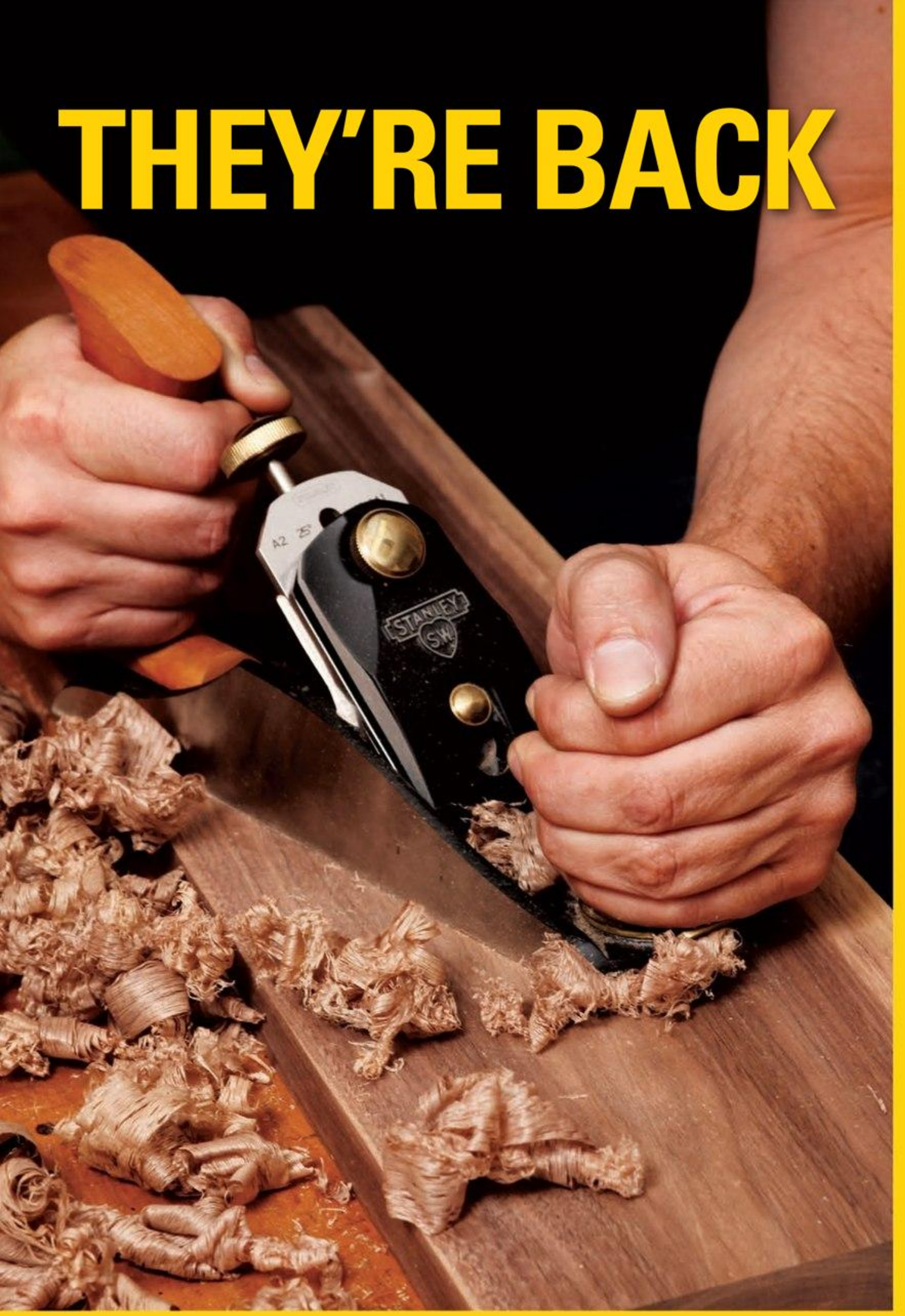
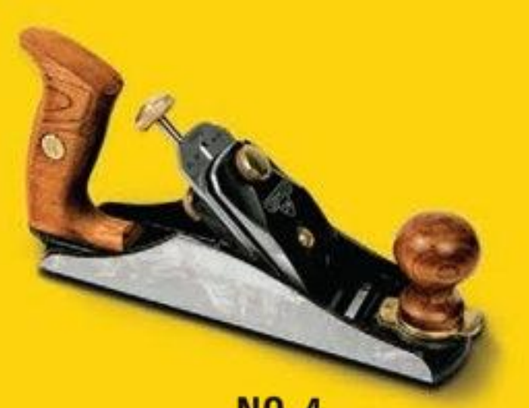
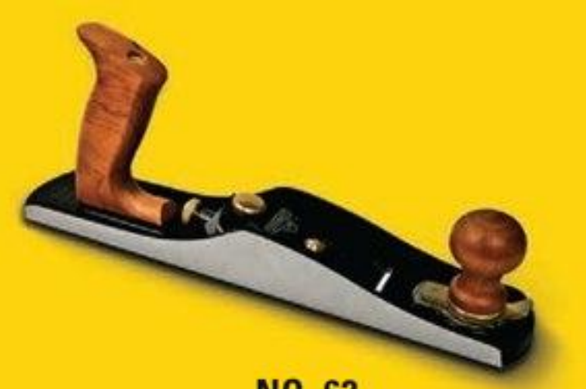


**NO. 4**
SMOOTHING PLANE



**NO. 62**
LOW ANGLE JACK PLANE

**NO. 9 -1/2**
BLOCK PLANE

**NO. 60 -1/2**
LOW ANGLE BLOCK PLANE

**NO. 92**
SHOULDER / CHISEL PLANE

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